SOIL SURVEY OF

Montgomery County, Mississippi

United States Department of Agriculture
Soil Conservation Service
In cooperation with
Mississippi Agricultural and Forestry
Experiment Station

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in the period 1959-70. Soil names and descriptions were approved in 1971. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1971. This survey was made cooperatively by the Soil Conservation Service and the Mississippi Agricultural and Forestry Experiment Station. It is part of the technical assistance furnished to the Montgomery County Soil Conservation District.

Soil maps in this survey may be copied without permission, but any enlargement of these maps could cause misunderstanding of the detail of mapping and result in erroneous interpretations. Enlarged maps do not show small areas of contrasting soils that could have been shown at a larger mapping scale.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms and woodlands; in selecting sites for roads, ponds, buildings, and other structures; and in judging the suitability of tracts of land for farming, industry, and recreation.

Locating Soils

All the soils in Montgomery County are shown on the detailed map at the back of this publication. This map consists of many sheets made from aerial photographs. Each sheet is numbered to correspond with a number on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside, and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information. This guide lists all the soils of the county in alphabetic order by map symbol and gives the capability classification of each. It also shows the page where each soil is described and the woodland group in which the soil has been placed.

Individual colored maps showing the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the soil map and the information in the text. Translucent material can be used as an overlay on the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions and from the discussions of the capability units and the woodland groups.

Foresters and others can refer to the section "Use of the Soils for Woodland," where the soils of the county are grouped according to their suitability for trees.

Game managers, sportsmen, and others can find information about soils and wildlife in the section "Use of the Soils for Wildlife."

Community planners and others can read about soil properties that affect the choice of sites for dwellings, industrial buildings, and recreation areas in the section "Town and Country Planning."

Engineers and builders can find, under "Engineering Uses of the Soils," tables that contain test data, estimates of soil properties, and information about soil features that affect engineering practices.

Scientists and others can read about how the soils formed and how they are classified in the section "Formation and Classification of the Soils."

Newcomers in Montgomery County may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the information about the county given in the section "General Nature of the County."

Cover: Cattle grazing ryegrass pasture on Collins silt loam.

Contents

Issued December 1975

SOIL SURVEY OF MONTGOMERY COUNTY, MISSISSIPPI

BY ABRAHAM E. THOMAS, SOIL CONSERVATION SERVICE

FIELDWORK BY ABRAHAM E. THOMAS, JERRY S. HUDDLESTON, AND CHARLES D. BOWEN, SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, IN COOPERATION WITH THE MISSISSIPPI AGRICULTURAL AND FORESTRY EXPERIMENT STATION

MONTGOMERY COUNTY is in the north-central part of Mississippi (fig. 1) and has a land area of 257,920 acres, or 403 square miles. Winona, the county seat, is about 85 miles north of Jackson and about 54 miles west of Mississippi State University.

The climate is moist and subtropical. The winters are mild, and the summers are warm and humid.

Farming is the main enterprise, but industry is increasing. Cotton, corn, soybeans, and grain sorghum are the main crops. Other sources of farm income are beef cattle, dairying, and wood products. More than half of the acreage is forested. Some of the people who live on farms work in nearby industries and are part-time farmers.

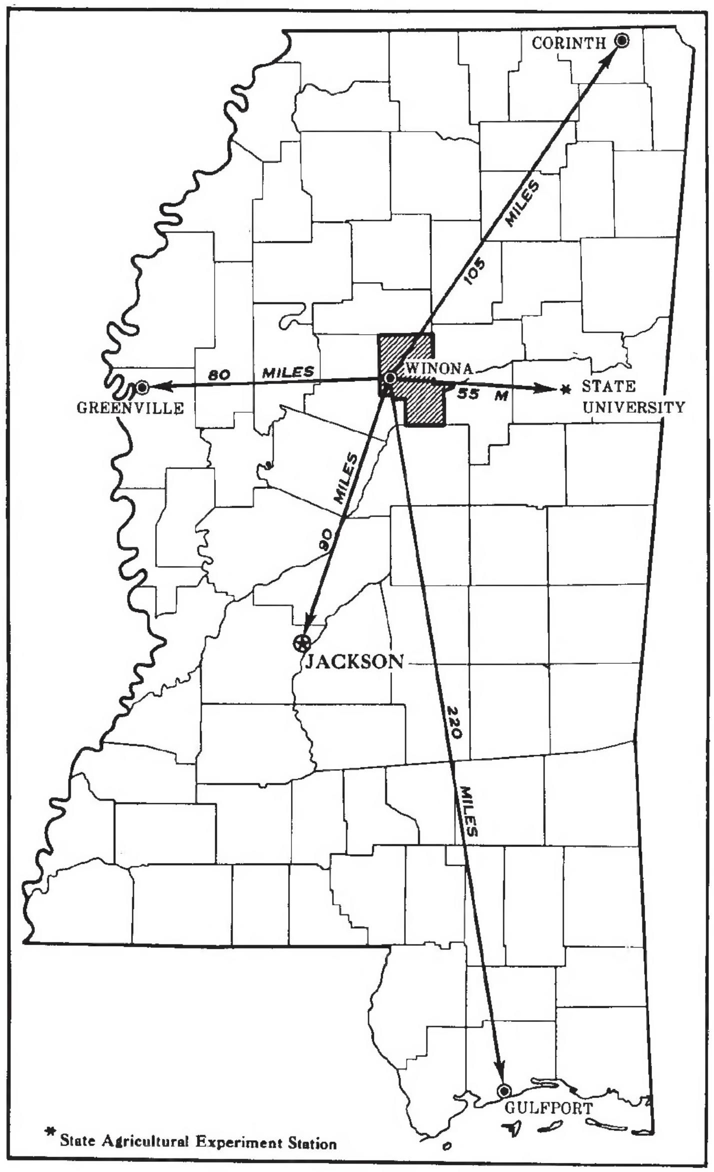


Figure 1.—Location of Montgomery County in Mississippi.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soil are in Montgomery County, where they are located, and how they can be used. The soil scientists went into the county knowing they were likely to find many soils they had already seen and perhaps some they had not. They observed the steepness, length, and shape of slopes; the size and speed of streams; the kinds of native plants or crops; the kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The *soil series* and the *soil phase* are the categories of soil classification most used in a local survey.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place

where a soil of that series was first observed and mapped. Grenada and Providence, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface layer and in slope or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Providence silt loam, 2 to 5 percent slopes, eroded, is one of several phases within the Providence series.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil phase.

Some mapping units are made up of soils of different series, or of different phases within one series. Three such kinds of mapping units are shown on the soil map of Montgomery County: soil complexes, soil associations, and undifferentiated groups.

A soil complex consists of areas of two or more soils, so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. Generally, the name of a soil complex consists of the names of the dominant soils, joined by a hyphen. Tippah-Sweatman complex, 8 to 12 percent slopes, eroded, is an example.

A soil association is made up of adjacent soils that occur as areas large enough to be shown individually on the soil map but are shown as one unit because the time and effort of delineating them separately cannot be justified. There is a considerable degree of uniformity in pattern and relative extent of the dominant soils, but the soils may differ greatly one from another. The name of an association consists of the names of the dominant soils, joined by a hyphen. Smithdale-Providence association, hilly, is an example.

An undifferentiated group is made up of two or more soils that could be delineated individually but are shown as one unit because, for the purpose of the soil survey, there is little value in separating them. The pattern and proportion of soils are not uniform. An area shown on the map may be made up of only one of the dominant soils, or of two or more. Sweatman and Smithdale soils, 17 to 30 percent slopes, severely eroded, is an undifferentiated soil group in this county.

In most areas surveyed there are places where the soil material is so rocky, so shallow, so severely eroded, or so variable that it has not been classified by soil series. These places are shown on the soil map and are described in the survey, but they are called land types and are given descriptive names. Gullied land is a land type in this county. It is in the Gullied land-Providence complex, 5 to 25 percent slopes.

While a soil survey is in progress, soil scientists take soil samples needed for laboratory measurements and for engineering tests. Laboratory data from the same kind of soil in other places are also assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil. Yields under defined management are estimated for all the soils.

Soil scientists observe how soils behave when used as a growing place for native and cultivated plants, and as material for structures, foundations for structures, or covering for structures. They relate this behavior to properties of the soils. For example, they observe that filter fields for onsite disposal of sewage fail on a given kind of soil, and they relate this to the slow permeability of the soil or a high water table. They see that streets, road pavements, and foundations for houses are cracked on a named kind of soil and they relate this failure to the high shrink-swell potential of the soil material. Thus, they use observation and knowledge of soil properties, together with available research data, to predict limitations or suitability of soils for present and potential uses.

After data have been collected and tested for the key, or benchmark, soils in a survey area, the soil scientists set up trial groups of soils. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others. They then adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under current methods of use and management.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Montgomery County. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of land use. Such a map is a useful general guide in managing a watershed, a wooded tract, or a wildlife area, or in planning engineering works, recreational facilities, and community developments. It is not a suitable map for planning

the management of a farm or field, or for selecting the exact location of a road, building, or similar structure, because the soils in any one association ordinarily differ in slope, depth, drainage, and other characteristics that affect their management.

The six soil associations in Montgomery County are discussed in the following pages. Unless otherwise stated, the terms for texture used in the descriptive heading of the associations apply to the surface layer of the major soils.

1. Gillsburg-Collins-Arkabutla association

Nearly level, somewhat poorly drained and moderately well drained, loamy soils; on flood plains

This association is on broad flood plains throughout the county. Slopes are 0 to 2 percent.

This association makes up about 18 percent of the county. Gillsburg soils make up about 45 percent of the association, Collins soils about 30 percent, and Arkabutla soils about 5 percent. Ariel, Cascilla, Guyton, and Iuka soils make up the rest.

Gillsburg soils occur throughout the association, and they are somewhat poorly drained. The surface layer is dark-brown silt loam about 6 inches thick. The next layer, to a depth of about 12 inches, is yellowish-brown, friable silt loam that has light brownish-gray and pale-brown mottles. Below this layer, and to a total depth of 65 inches, is silt loam that is light brownish gray in the upper part and mottled in shades of brown and gray in the lower part.

Collins soils occupy mainly bands adjacent to stream channels, and they are moderately well drained. The surface layer is brown silt loam about 6 inches thick. The underlying material, to a depth of 50 inches, is friable silt loam. The upper 22 inches of this material is yellowish brown and has pale-brown and light brownish-gray mottles. The next 9 inches is dark yellowish brown and has light brownish-gray mottles. The lower 13 inches is mottled in shades of brown and gray.

Arkabutla soils occupy mainly broad flats, and they are somewhat poorly drained. The surface layer is dark yellowish-brown silt loam about 5 inches thick. The next layer extends to a depth of about 44 inches. The upper 13 inches of this layer is friable silt loam that is dark yellowish brown and mottled with light brownish gray in the upper part but dark brown and mottled in shades of gray in the lower part. The next 26 inches is firm silt loam that is light brownish gray and has grayish-brown and gray mottles in the upper part but is gray and has light brownish-gray and grayish-brown mottles in the lower part. The underlying material, to a depth of about 60 inches, is silty clay loam mottled in shades of gray and brown.

Most of this association is open land that is used for cultivated crops and pasture. A small acreage is wooded. Limitations to the development of industrial, commercial, and residential areas are severe because of flooding and a seasonal high water table. Limitations to recreational development are moderate to severe.

2. *Chenneby-Arkabutla-Gillsburg association*

Nearly level, somewhat poorly drained, loamy soils; on flood plains

This association is on broad flood plains along Big Black River. Slopes are 0 to 2 percent.

This association makes up about 5 percent of the county. Chenneby soils make up about 26 percent of the association, Arkabutla soils about 24 percent, and Gillsburg soils about 15 percent. Cascilla, Collins, and poorly drained soils make up the rest.

Chenneby soils occupy mainly bands adjacent to former stream channels, and they are somewhat poorly drained. The surface layer is silt loam about 17 inches thick. The upper part of the surface layer is dark brown, and the lower part is dark yellowish brown and has light brownish-gray mottles. The next layer, to a depth of about 65 inches, is silt loam. The upper 16 inches of this layer is yellowish brown that has light brownish-gray and gray mottles. The next 10 inches is mottled in shades of light brownish gray and brown. The lower 23 inches is gray and mottled in shades of brown.

Arkabutla soils occupy mainly broad flats, and they are somewhat poorly drained. The surface layer is dark yellowish-brown silt loam about 5 inches thick. The next layer extends to a depth of about 44 inches. The upper 13 inches of this layer is friable silt loam that is dark yellowish brown and mottled with light brownish gray in the upper part but is dark brown and mottled in shades of gray in the lower part. The next 26 inches is silt loam that is light brownish gray and mottled with grayish brown and gray in the upper part and gray mottled with brownish gray and grayish brown in the lower part. The underlying material, to a depth of about 60 inches, is silty clay loam mottled in shades of gray and brown.

Gillsburg soils occur throughout the association, and they are somewhat poorly drained. The surface layer is dark-brown silt loam about 6 inches thick. Below the surface layer, to a depth of about 12 inches, is yellowish-brown, friable silt loam that has light brownish-gray and pale-brown mottles. Below this layer, and extending to a total depth of 60 inches, is silt loam that is light brownish gray in the upper part and mottled in shades of brown and gray in the lower part.

About 90 percent of this association is in hardwood forest. A small acreage is used for crops and pasture. Limitations to the development of industrial, commercial, and residential areas are severe because of flooding and a high seasonal water table. Limitations to recreational uses are severe. This association is suited to woodland and wetland wildlife.

3. *Grenada-Calloway association*

Nearly level and gently sloping, moderately well drained and somewhat poorly drained, loamy soils that have a fragipan; on uplands

This association is on uplands and terraces that border the flood plains of the larger streams in the county. Slopes are 0 to 5 percent. Shallow upland drainageways extend through the association. The

nearly level soils are on the broad ridgetops, and the gently sloping soils are on the sides of the ridges.

This association makes up about 4 percent of the county. Grenada soils make up about 40 percent of the association, and Calloway soils about 30 percent. Collins, Guyton, Loring, and Providence soils make up the rest.

Grenada soils commonly occupy the slightly higher positions on the ridges, and they are moderately well drained. The surface layer is brown silt loam about 7 inches thick. Below the surface layer, to a depth of about 25 inches, is yellowish-brown, friable silt loam that has pale-brown and light-gray mottles in the lower part. The next layer, to a depth of about 30 inches, is light-gray silt loam that has yellowish-brown mottles. Below this layer, and to a total depth of about 60 inches, is a firm, compact and brittle silt loam fragipan. The upper part of the fragipan is mottled in shades of brown and gray, and the lower part is dark yellowish brown mottled in shades of gray and brown.

Calloway soils occupy the broad flats, and they are somewhat poorly drained. The surface layer is grayish-brown silt loam about 6 inches thick. Below the surface layer, to a depth of about 17 inches, is friable silt loam. The upper part of this layer is brown and mottled with yellowish brown, and the lower part is yellowish brown and mottled with pale brown and light brownish gray. The next layer, reaching to a depth of about 22 inches, is light-gray silt loam that has yellowish-brown and brownish-gray mottles. Below this layer, and extending to a depth of about 60 inches, is a firm, compact and brittle silt loam fragipan. The upper part of the fragipan is brownish and mottled in shades of gray, and the lower part is mottled in shades of brown and gray.

Most of this association is open land that is used for cultivated crops and pasture. A small acreage is wooded. Limitations to the development of industrial, commercial, residential, and recreational areas are moderate to severe because of wetness and a perched water table during rainy seasons. This association is suited to use as habitat for openland and woodland wildlife.

4. Providence-Loring association

Gently sloping and sloping, moderately well drained, loamy soils that have a fragipan; on uplands

This association is on uplands. The ridgetops are broad to medium in width, and the side slopes are broken by short drainageways. Intermittent streams are in the narrow valleys between the ridges.

This association makes up about 6 percent of the county. Providence soils make up about 50 percent of the association, and Loring soils about 24 percent. Smithdale and Grenada soils, which are on hills, and Collins and Gillsburg soils, which are in the narrow valleys and drainageways, make up the rest.

Providence soils are on ridgetops and side slopes, and they are moderately well drained and are mainly sloping. The surface layer is dark yellowish-brown silt loam about 4 inches thick. The next layer is about 25 inches thick. The upper 8 inches of this layer is yellowish-red, friable silty clay loam, the next 8 inches is strong-brown, friable silty clay loam, and the lower 9 inches is dark-brown, friable silt loam. Below this, and extending to a depth of about 57 inches, is a firm, compact, and brittle fragipan. The fragipan is dark yellowish-brown mottled in shades of gray. It is silt loam in the upper part and loam in the lower part. The underlying material, to a depth of about 65 inches, is yellowish-brown sandy loam that has light-gray mottles.

Loring soils are on ridgetops and side slopes. They are moderately well drained and are moderately sloping and gently sloping. The surface layer is silt loam about 5 inches thick. It is dark grayish brown in the upper 2 inches and yellowish brown in the lower 3 inches. The next layer, which extends to a depth of 27 inches, is strong-brown, friable silty clay loam in the upper part and dark-brown, friable silt loam in the lower part. Below this, and extending to a depth of about 48 inches, is a firm, compact and brittle fragipan. The fragipan is dark yellowish-brown silt loam mottled in shades of gray and brown in the upper part and dark-brown silt loam mottled in shades of gray and brown in the lower part. Below this, to a depth of about 60 inches, is dark-brown silt loam mottled in shades of gray and brown.

Most of this association is open land that is used for crops and pasture, but a small acreage is wooded. The city of Winona and the surrounding suburban areas are in this association. Limitations to the development of industrial, commercial, residential, and recreational areas are slight to moderate in the less sloping areas and severe in the more strongly sloping areas. This association is well suited to openland and woodland wildlife.

5. Smithdale-Providence association

Mainly gently sloping to hilly, well drained and moderately well drained, loamy soils; some have a fragipan; on uplands

This association is on uplands that are dissected by intermittent streams in narrow valleys and by many short drainageways. It has long, winding, narrow ridgetops and sloping to very steep side slopes.

This association makes up about 41 percent of the county. Smithdale soils make up about 40 percent of the association, and Providence soils about 25 percent. Loring, Sweatman, and Tippah soils, which are on hills, and Collins, Gillsburg, and Iuka soils, which are in narrow valleys, make up most of the rest.

Smithdale soils are on side slopes, and they are well drained. The surface layer is sandy loam, about 11 inches thick, that is dark grayish brown in the upper 4 inches and brown in the lower 7 inches. The next layer is yellowish-red, friable sandy clay loam to a depth of about 38 inches, yellowish-red sandy loam to a depth of 52 inches, and red sandy loam to a depth of 80 inches.

Providence soils occupy mainly ridgetops and moderate side slopes, and they are moderately well drained. The surface layer is dark yellowish-brown silt loam about 4 inches thick. The next layer is about 25 inches thick. The upper 8 inches of this layer is yel-

lowish-red, friable silty clay loam, the next 8 inches is strong-brown, friable silty clay loam, and the lower 9 inches is strong-brown, friable silt loam. Below this, and extending to a depth of about 57 inches, is a firm, compact and brittle fragipan. The fragipan is dark yellowish brown and has light brownish-gray mottles. It is silt loam in the upper part and loam in the lower part. The underlying material, to a depth of about 65 inches, is yellowish-brown sandy loam that has light-gray mottles.

About 70 percent of this association is wooded. The narrow bottoms and less sloping areas are used for crops and pasture. Selected sites within the association are suitable for the development of industrial, commercial, or residential areas, but the steep slopes in most of this association are a severe limitation to these uses. Fishing, hiking, and horseback riding are suitable recreational uses. This association is suited to openland and woodland wildlife.

6. Smithdale-Sweatman-Providence association

Mainly hilly, well drained and moderately well drained, loamy soils; some are loamy throughout, some have a clayey subsoil, and some have a fragipan; on uplands

This association is on hilly uplands that are dissected by intermittent streams in narrow valleys and by many short drainageways. It has long, winding, narrow ridgetops and sloping to steep side slopes.

This association makes up about 26 percent of the county. Smithdale soils make up about 36 percent of this association, Sweatman soils about 24 percent, and Providence soils about 20 percent. Most of the rest consists of Tippah soils; of soils on the hills that have a loamy subsoil and are underlain by shale at a depth of about 30 inches; and of Ariel, Collins, and Gillsburg soils in the narrow valleys.

Smithdale soils occupy generally the upper part of side slopes in the steeper areas, and they are well drained. The surface layer is sandy loam about 11 inches thick. It is dark grayish brown in the upper 4 inches and brown in the lower 7 inches. The next layer is yellowish-red, friable sandy clay loam to a depth of 38 inches, yellowish-red, friable sandy loam to a depth of about 52 inches, and red sandy loam to a depth of 80 inches.

Sweatman soils generally occupy the lower and middle parts of side slopes, and they are well drained. The surface layer is dark-brown silt loam about 2 inches thick. The next layer extends to a depth of 44 inches. The upper 12 inches of this layer is yellowish-red, firm silty clay; the next 25 inches is red, firm clay that is mottled in shades of gray and red in the lower part; and the lower 5 inches is strong-brown, firm silty clay that has gray and red mottles. The underlying material, to a depth of about 60 inches, is light brownish-gray shale.

Providence soils commonly occupy ridgetops and the upper parts of side slopes, and they are moderately well drained. The surface layer is dark yellowish-brown silt loam about 4 inches thick. The next layer is 25 inches thick. The upper 8 inches of this layer is yellowish-red, friable silty clay loam, the next 8 inches is strong-brown, friable silty clay loam; and the lower 9 inches is strong-brown, friable silt loam. Below this, and extending to a depth of about 57 inches, is a firm, compact and brittle fragipan. The fragipan is dark yellowish brown and has brownish-gray mottles. It is silt loam in the upper part and loam in the lower part. The underlying material, to a depth of about 65 inches, is yellowish-brown sandy loam that has light-gray mottles.

About 70 percent of this association is wooded. The narrow bottoms and the less sloping areas are used for crops and pasture. Selected sites within this association are suitable for the development of industrial, commercial, or residential areas, but the steepness in most of the association is a severe limitation to these uses. Fishing, hiking, and horseback riding are suitable recreational uses.

Descriptions of the Soils

This section describes the soil series and mapping units in Montgomery County. Each soil series is described in detail, and then, briefly, each mapping unit in that series. Unless it is specifically mentioned otherwise, it is to be assumed that what is stated about the soil series holds true for the mapping units in that series. Thus, to get full information about any one mapping unit, it is necessary to read both the description of the mapping unit and the description of the soil series to which it belongs.

An important part of the description of each soil series is the soil profile, that is, the sequence of layers from the surface downward to rock or other underlying material. Each series contains two descriptions of this profile. The first is brief and in terms familiar to the layman. The second is much more detailed and is for those who need to make thorough and precise studies of soils. The profile described in the series is representative for mapping units in that series. If the profile of a given mapping unit is different from the one described for the series, these differences are stated in describing the mapping unit, or they are differences that are apparent in the name of the mapping unit. Color terms are for moist soil unless otherwise stated.

As mentioned in the section "How This Survey Was Made," not all mapping units are members of a soil series. Gullied land, for example, does not belong to a soil series but, nevertheless, is listed in alphabetic order along with the soil series.

Following the name of each mapping unit is a symbol in parentheses. This symbol identifies the mapping unit on the detailed soil map. Listed at the end of each description of a mapping unit is the capability unit and woodland group in which the mapping unit has been placed. An explanation of the capability classification system is given in the subsection "Capability Grouping." A discussion of woodland groups is given in the section "Use of the Soils for Woodland." The "Guide to Mapping Units" at the back of this survey shows the capability unit and woodland group for each soil in the county.

The acreage and proportionate extent of each mapping unit are shown in table 1. Many of the terms used in describing soils can be found in the Glossary, and more detailed information about the terminology and methods of soil mapping can be obtained from the Soil Survey Manual (12).[1]

TABLE 1.—*Approximate acreage and proportionate extent of the soils*

Soil	Acres	Percent
Ariel silt loam	1,850	0.7
Arkabutla silt loam	4,450	1.7
Brewton fine sandy loam	800	.3
Bruno soils	475	.2
Calloway silt loam	3,125	1.2
Cascilla silt loam	3,250	1.3
Chenneby-Arkabutla association	8,900	3.5
Collins silt loam	16,400	6.4
Gillsburg silt loam	25,400	9.8
Grenada silt loam, 0 to 2 percent slopes	1,700	.6
Grenada silt loam, 2 to 5 percent slopes, eroded	3,400	1.3
Gullied land-Providence complex, 5 to 25 percent slopes	10,100	4.0
Guyton silt loam	2,600	1.0
Iuka fine sandy loam	1,700	.6
Loring silt loam, 2 to 5 percent slopes, eroded	360	.1
Loring silt loam, 5 to 8 percent slopes, eroded	3,500	1.4
Mashulaville fine sandy loam	1,600	.6
Providence silt loam, 2 to 5 percent slopes, eroded	2,400	.9
Providence silt loam, 5 to 8 percent slopes	6,660	2.6
Providence silt loam, 5 to 8 percent slopes, severely eroded	3,200	1.3
Providence silt loam, 8 to 12 percent slopes, eroded	4,780	1.8
Providence silt loam, 8 to 12 percent slopes, severely eroded	10,100	4.0
Smithdale-Providence association, hilly	72,050	27.9
Smithdale-Providence complex, 8 to 17 percent slopes, severely eroded	20,580	8.0
Smithdale-Sweatman-Providence association, hilly	36,240	14.0
Sweatman and Smithdale soils, 17 to 30 percent slopes, severely eroded	9,200	3.6
Tippah-Sweatman complex, 8 to 12 percent slopes, eroded	3,100	1.2
Total	257,920	100.0

Ariel Series

The Ariel series consists of well-drained soils that formed in loamy sediment having a high content of silt. Slopes are 0 to 2 percent.

In a representative profile, the surface layer is brown silt loam about 5 inches thick. The next layer, to a depth of 25 inches, is dark yellowish-brown, friable silt loam. This layer is underlain by a buried soil. The surface layer of the buried soil is about 5 inches of pale-brown silt loam that has dark yellowish-brown mottles. The next layer of the buried soil extends to a depth of 65 inches and is silt loam mottled in shades of brown and gray.

Representative profile of Ariel silt loam in a pasture 5 miles west of the Webster County line and one-half mile south of the Grenada County line, NW¼SW¼ sec. 20, T. 21 N., R. 7 E.

[1] Italic numbers in parentheses refer to Literature Cited, p. 49.

Ap—0 to 5 inches, brown (10YR 5/3) silt loam; weak, fine, granular structure; very friable; many fine roots; few brown root stains and black splotches; medium acid; clear, smooth boundary.

B21—5 to 17 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, medium, subangular blocky structure; friable; few silt or oxide coatings on ped faces; few fine roots; strongly acid; clear, smooth boundary.

B22—17 to 25 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, medium, subangular blocky structure; friable; few fine roots; few silt or oxide coatings on ped faces; common, fine, brown concretions; strongly acid; clear, smooth boundary.

A2b—25 to 30 inches, pale-brown (10YR 6/3) silt loam; many, medium, distinct, dark yellowish-brown (10YR 4/4) mottles; weak, medium, subangular blocky structure; friable; common fine pores; few, fine, black concretions; strongly acid; clear, smooth boundary.

B21b—30 to 56 inches, mottled yellowish-brown (10YR 5/4) and light-gray (10YR 7/2) silt loam; weak, coarse, prismatic structure parting to weak, medium, subangular blocky; friable; slightly compact and brittle; common, fine and medium, black concretions; few tongues of gray silt between prisms; strongly acid; clear, smooth boundary.

B22b—56 to 65 inches, yellowish-brown (10YR 5/4) silt loam; common, medium, distinct, light-gray (10YR 7/1) mottles; weak, coarse, prismatic structure parting to weak, medium, subangular blocky; friable; slightly compact and brittle; few tongues of gray silt between prisms; common, fine, black concretions; strongly acid.

The A horizon ranges from dark grayish brown to grayish brown, dark yellowish brown, or brown. The B2 horizon is dark yellowish-brown, dark-brown, yellowish-brown or brown silt loam that has a clay content of 12 to 18 percent. The A2b horizon is pale brown, yellowish brown, or brown, or it is mottled in shades of brown and gray. The B2b horizon has a brownish matrix and few to many gray mottles, or it is mottled in shades of brown and gray. It is silt loam or loam. Black and brown concretions range from few to many. Reaction is strongly acid or very strongly acid in all horizons, except where the surface layer has been limed.

Ariel soils are associated with Cascilla and Gillsburg soils. Ariel soils differ from Cascilla soils in having a less clayey B horizon and buried A and B horizons. They are browner in the B2 horizon and are better drained than Gillsburg soils.

Ariel silt loam (Ar).—This is a well-drained soil on flood plains and low terraces. Slopes are 0 to 2 percent. This soil is flooded for short periods late in winter or early in spring. Slight or moderate crop damage can result if flooding occurs during the growing season.

Included with this soil in mapping were small areas of Cascilla and Gillsburg soils.

Runoff is slow on this soil. Available water capacity is very high, and permeability is moderately slow. Reaction is strongly acid or very strongly acid, except where the surface layer has been limed.

Most of the acreage is cultivated or is used for pasture, but a small acreage is wooded. This soil is well suited to cotton, corn, soybeans, small grain, pasture plants, and hardwood and pine trees.

This soil can be worked throughout a moderately wide range of moisture content without clodding. Under good management, it can be used for row crops continuously. Crop residue that is shredded and left on the surface as a mulch helps to reduce crusting. In

most fields the use of surface drains and row arrangements helps to remove excess water. In some areas diversions are needed to intercept water from adjacent hills. (Capability unit IIw–2; woodland group 1o7)

Arkabutla series

The Arkabutla series consists of somewhat poorly drained soils that formed in loamy sediment having a high content of silt. Slopes are 0 to 2 percent.

In a representative profile, the surface layer is dark yellowish-brown silt loam about 5 inches thick. The next layer extends to a depth of 44 inches. The upper 13 inches of this layer is friable silt loam that is dark yellowish brown and has light brownish-gray mottles in the upper part and is dark brown mottled in shades of gray in the lower part. The lower 26 inches is light brownish-gray, firm silt loam that has grayish-brown and gray mottles in the upper part and is gray silt loam that has light brownish-gray and grayish-brown mottles in the lower part. The underlying material, to a depth of about 60 inches, is silty clay loam mottled in shades of gray and brown.

Representative profile of Arkabutla silt loam in a cultivated field one-fourth mile north of State Route 404 and 200 feet west of gravel road, SW¼NW¼ sec. 29; T. 21 N., R. 7 E.

Ap—0 to 5 inches, dark yellowish-brown (10YR 4/4) silt loam; few, medium, distinct, grayish-brown (10YR 5/2) mottles; weak, medium, granular structure; friable; many fine roots; few, fine, black concretions; slightly acid; abrupt, smooth boundary.

B21—5 to 10 inches, dark yellowish-brown (10YR 4/4) silt loam; few, medium, distinct, light brownish-gray (10YR 6/2) mottles; weak, medium, subangular blocky structure; friable; many fine roots; few, fine, black concretions; medium acid; abrupt, smooth boundary.

B22—10 to 18 inches, dark-brown (10YR 4/3) silt loam; many, medium, distinct, gray (10YR 6/1) and light brownish-gray (2.5Y 6/2) mottles; weak, medium, subangular blocky structure; friable; few fine roots; few, fine, black concretions; strongly acid; clear, smooth boundary.

B23g—18 to 30 inches, light brownish-gray (2.5Y 6/2) silt loam; common, medium, faint, grayish-brown (2.5Y 5/2) mottles and few, medium, faint, gray (10YR 6/1) mottles; weak, medium, subangular blocky structure; firm; few fine roots; few, fine, black concretions; strongly acid; clear, wavy boundary.

B3g—30 to 44 inches, gray (10YR 6/1) silt loam; common, medium, faint, light brownish-gray (10YR 6/2) mottles and few pockets of grayish brown (10YR 5/2); weak, medium, subangular blocky structure; firm; common, fine, black concretions; strongly acid; clear, wavy boundary.

Cg—44 to 60 inches, mottled gray (10YR 6/1) and strong-brown (7.5YR 5/6) silty clay loam; structureless; firm; few, fine, black concretions; strongly acid.

Arkabutla silt loam (At).—This somewhat poorly drained soil is on flood plains. Slopes are 0 to 2 percent. This soil is flooded for short periods in winter or early in spring. Slight or moderate crop damage results if flooding occurs during the growing season.

Included with this soil in mapping were a few areas of Cascilla, Chenneby, and Gillsburg soils.

Runoff is slow on this soil. Available water capacity is very high, and permeability is moderate. Reaction is strongly acid or very strongly acid, except for areas where the surface layer has been limed.

Most of the acreage is cultivated or is used for pasture, but a small acreage is wooded. This soil is suited to cotton, corn, soybeans (fig. 2), small grains, pasture plants, and hardwood and pine trees.

This soil can be worked throughout a moderate range of moisture content without clodding. Under good management, it can be used for row crops continuously. Crop residue that is shredded and left on the surface as a mulch helps to reduce crusting. In most fields row arrangement and the use of surface drains help to remove excess surface water. (Capability unit IIw–3; woodland group 1w8)

Brewton Series

The Brewton series consists of somewhat poorly drained soils that formed in loamy sediment. Slopes are 0 to 2 percent.

In a representative profile, the surface layer is dark grayish-brown fine sandy loam about 5 inches thick. The next layer, to a depth of about 17 inches, is yellowish-brown, friable loam that has light brownish-gray mottles. The next layer is light-gray loam that has yellowish-brown mottles. It extends to a depth of about 25 inches. Below this layer, to a depth of about 60 inches, is loam mottled in shades of brown and gray.

Representative profile of Brewton fine sandy loam at 3.5 miles south of Kilmichael, SW¼SW¼ sec. 28; T. 18 N., R. 7 E.

Ap—0 to 5 inches, dark grayish-brown (10YR 4/2) fine sandy loam; weak, fine, granular structure; very friable; common fine roots; strongly acid; clear, smooth boundary.

B2—5 to 17 inches, yellowish-brown (10YR 5/6) loam; common, medium, distinct, light brownish-gray (10YR 6/2) mottles; weak, medium, subangular blocky structure; friable; common fine roots; many fine pores; few clay films in pores and bridging sand grains; strongly acid; clear, smooth boundary.

A'2&B'21t—17 to 25 inches, light-gray (10YR 7/1) loam; many, medium, distinct, yellowish-brown (10YR 5/8) mottles; weak, medium, subangular blocky structure; friable; slightly compact and brittle in yellowish-brown part; few fine roots; thin clay films on sand grains and in pores; few, fine, brown concretions; very strongly acid; clear, wavy boundary.

B'22t—25 to 39 inches, mottled yellowish-brown (10YR 5/8) and light-gray (10YR 7/1) loam; weak, medium, subangular blocky structure; firm; compact and brittle in yellowish-brown part; friable in light-gray part; few fine roots; few, fine, brown concretions; strongly acid; gradual, wavy boundary.

B'23t—39 to 60 inches, mottled light brownish-gray (2.5YR 6/2) and yellowish-brown (10YR 5/8) loam; weak, medium, subangular blocky structure; friable in light brownish-gray part; firm, compact, and brittle in yellowish-brown part; few, fine, brown concretions; few fine mica flakes; strongly acid.

The Ap horizon ranges from dark grayish brown to grayish brown, brown, or yellowish brown. The B2 horizon is brown, yellowish-brown, or dark yellowish-brown loam or silt loam and has grayish mottles. It contains less than 18 percent clay and more than 15 percent sand that is coarser than very fine sand. The A'2 and B'21t horizon is fine sandy loam or loam that is light gray or gray or entirely

***Figure 2.*—Field of soybeans on Arkabutla silt loam.**

mottled in shades of brown and gray. The B22t and B23t horizons are sandy loam or loam mottled in shades of brown, yellow, and gray. About 40 to 50 percent, by volume, of soil material in the B2t horizon is brittle and compact. Black and brown concretions range from few to many in the B2t horizon. Reaction is strongly acid or very strongly acid throughout, except for areas where the surface layer has been limed.

Brewton soils are associated with Iuka and Mashulaville soils. Brewton soils are not so well drained as Iuka soils and lack the fine stratification that those soils have. They are browner and better drained than Mashulaville soils, and lack the fragipan of those soils.

Brewton fine sandy loam (Br).—This is a somewhat poorly drained soil on broad flats and stream terraces. Slopes are 0 to 2 percent.

Included with this soil in mapping were a few areas of Iuka and Mashulaville soils.

Runoff is slow on this soil. Available water capacity is medium, and permeability is slow. Reaction is strongly acid or very strongly acid.

Most of the acreage is cultivated or is used for pasture, but a small acreage is wooded. This soil is suited to corn, soybeans, small grains, pasture plants, and pine and hardwood trees.

This soil can be worked throughout a fairly wide range of moisture content without clodding. Under good management, it can be used for row crops continuously. Crop residue that is shredded and left on the surface as a mulch helps to prevent crusting. In most fields rows can be arranged to provide surface drainage. (Capability unit IIIw-1; woodland group 2w8)

Bruno Series

The Bruno series consists of excessively drained soils that formed in sandy sediment. Slopes are 0 to 2 percent.

In a representative profile, the surface layer is brown silt loam about 6 inches thick. The underlying material, to a depth of 60 inches, is stratified, brown and pale-brown fine sand and brown and dark-brown silt loam.

Representative profile of Bruno silt loam, in an area of Bruno soils, 0.6 mile east of State Route 51, and 150 feet north of Sykes Creek, NW¼NW¼ sec. 24, T. 21 N., R. 5 E.

A1—0 to 6 inches, brown (10YR 5/3) silt loam; weak, medium, granular structure, very friable; many fine and medium roots; few sand lenses; strongly acid; abrupt, smooth boundary.

C1—6 to 12 inches, brown (10YR 5/3) fine sand; structureless; loose; thin horizontal bedding planes; common fine and medium roots; slightly acid; abrupt, smooth boundary.

C2—12 to 15 inches, dark-brown (10YR 4/3) silt loam and pale-brown (10YR 6/3) fine sand; structureless; very friable; thin horizontal bedding planes; few fine and medium roots; strongly acid; abrupt, smooth boundary.

C3—15 to 21 inches, brown (10YR 5/3) fine sand; structureless; loose; few fine roots; slightly acid; abrupt, smooth boundary.

C4—21 to 45 inches, dark-brown (10YR 4/3) silt loam and pale-brown (10YR 6/3) fine sand; structureless; very friable and loose; thin horizontal bedding planes; layers of silt loam 1 to 5 inches thick and fine sand 3 to 8 inches thick; few fine roots; medium acid; clear, smooth boundary.

C5—45 to 60 inches, brown (10YR 5/3) silt loam and pale-brown (10YR 6/3) fine sand; structureless; very friable; strongly acid.

The A horizon ranges from brown to dark-brown or yellowish-brown silt loam or sandy loam to loamy sand. The C horizon is pale brown, brown, dark brown, yellowish brown, or dark yellowish brown. It is dominantly loamy sand or fine sand that has strata of silt loam and sandy loam. Reaction ranges from strongly acid to neutral.

Bruno soils are associated with Collins and Iuka soils. Bruno soils have a higher sand content and are better drained than those soils.

Bruno soils (Bu).—These are excessively drained soils on flood plains along streams. The surface layer is silt loam, sandy loam, or loamy sand. Slopes are 0 to 2 percent. These soils are flooded in winter and early in spring. Slight or moderate crop damage results if flooding occurs during the growing season.

Included with these soils in mapping were a few small areas of Collins and Iuka soils. Also included were a few areas that lack the thin strata of silt loam.

Runoff is slow on these soils. Available water capacity is low, and permeability is moderately rapid. Reaction is strongly acid to neutral.

Most of the acreage is used for pasture. A small acreage is cultivated, and a small acreage is wooded. These soils are suited to pasture plants and trees, but they are poorly suited to cotton, corn, soybeans, and small grains.

These soils can be worked throughout a wide range of moisture content without clodding. Crop residue that is shredded and left on the surface as a mulch helps to reduce crusting. These soils are droughty in summer and fall. (Capability unit IIIs–1; woodland group 2s5)

Calloway Series

The Calloway series consists of somewhat poorly drained soils that have a fragipan. These soils formed in loamy material having a high content of silt. Slopes are 0 to 2 percent.

In a representative profile, the surface layer is grayish-brown silt loam about 6 inches thick. The next layer, to a depth of about 17 inches, is friable silt loam. The upper part is brown and has yellowish-brown mottles, and the lower part is yellowish brown and has pale-brown and light brownish-gray mottles. Below this layer, to a depth of about 22 inches, is light-gray silt loam that has yellowish-brown and grayish-brown mottles. The next layer, to a depth of about 60 inches, is a firm, compact and brittle silt loam fragipan. The upper part of the fragipan is grayish brown and has light brownish-gray mottles, and the lower part is mottled in shades of brown and gray.

Representative profile of Calloway silt loam, in a cultivated field, 2½ miles north of Sweatman, NW¼SW¼ sec. 21, T. 21 N., R. 7 E.

Ap—0 to 6 inches, grayish-brown (10YR 5/2) silt loam; few, medium, faint, pale-brown (10YR 6/3) mottles; weak, medium, granular structure; friable; many fine roots; strongly acid; abrupt, smooth boundary.

B21—6 to 11 inches, brown (10YR 4/3) silt loam; few, medium, faint, yellowish-brown (10YR 5/4) mottles; weak, medium, subangular blocky structure; friable; few worm casts; many fine pores; common roots; strongly acid; clear, smooth boundary.

B22—11 to 17 inches, yellowish-brown (10YR 5/4) silt loam; common, medium, faint, pale-brown (10YR 6/3) mottles and few, fine, medium, distinct, light brownish-gray mottles; weak, medium, subangular blocky structure; friable; few roots; many fine pores; clay films in some pores; few, fine, black concretions; strongly acid; clear, wavy boundary.

A′2—17 to 22 inches, light-gray (10YR 7/1) silt loam; many, medium, distinct, yellowish-brown (10YR 5/6) mottles and many, medium, faint, grayish-brown (10YR 5/2) mottles; weak, medium, subangular blocky structure; friable; very porous; many, fine, brown concretions; strongly acid; clear, irregular boundary.

B′x1—22 to 36 inches, grayish-brown (10YR 5/2) silt loam; common, medium, faint, light brownish-gray (10YR 6/2) mottles; moderate, coarse, prismatic structure parting to moderate, medium, subangular blocky; firm, compact and brittle; light-gray (10YR 7/1) silt between prisms and on peds; many, fine, black concretions and dark stains; common fine voids; few thin clay films on peds; strongly acid; gradual, wavy boundary.

B′x2—36 to 60 inches, mottled grayish-brown (10YR 5/2), dark yellowish-brown (10YR 4/4), and light-gray (10YR 7/1) silt loam; moderate, coarse, prismatic structure parting to moderate, medium, subangular blocky; firm, compact and brittle; many, fine, black concretions; light-gray (10YR 7/1) silt between prisms, in cracks, and on peds; common fine voids; few thin clay films on peds; medium acid.

The A horizon ranges from grayish brown to dark grayish brown, brown, or dark yellowish brown. The B2 horizon is brown, yellowish brown, or light yellowish brown and has few to many mottles in shades of gray and brown. The B2 horizon is silt loam and has a clay content ranging from 18 to 25 percent and a sand content of less than 10 percent. The A′2 horizon is pale brown, light brownish gray, or light gray and has few to many mottles in shades of brown. Remnants of the B horizon range from few to many. The A′2 horizon is silt loam or silt. The B′x horizon is grayish brown or is entirely mottled in shades of gray and brown, and it ranges from silt loam to silty clay loam. Depth to the fragipan ranges from 18 to 26 inches. Black and brown concretions range from few to many. Reaction is medium acid or strongly acid.

Calloway soils are associated with Grenada, Guyton, and Mashulaville soils. Calloway soils are not so well drained

as Grenada soils, and in the upper 16 inches of the profile, they have grayish mottles that are lacking in those soils. Calloway soils are browner and better drained than Guyton soils, which do not have a fragipan. Calloway soils are browner and better drained than Mashulaville soils and, unlike those soils, do not have more than 15 percent sand in the upper part of the profile.

Calloway silt loam (Ca).—This is a somewhat poorly drained soil on terraces and uplands. Slopes are 0 to 2 percent.

Included with this soil in mapping were a few small areas of Grenada soils and a few small areas of Guyton soils.

Runoff is slow on this soil. Available water capacity is medium, and permeability is slow. Reaction is medium acid or strongly acid.

Most of the acreage is cultivated or is used for pasture, but a small acreage is wooded. This soil is suited to cotton, corn, soybeans, small grain (fig. 3), pasture plants, and hardwood and pine trees.

This soil can be worked throughout a moderate range of moisture content without clodding. Under good management, it can be used for row crops continuously. Crop residue that is shredded and left on the surface as a mulch helps to reduce crusting. In most fields rows can be arranged to provide surface drainage. (Capability unit IIw-4; woodland group 2w8)

Cascilla Series

The Cascilla series consists of well-drained soils that formed in loamy sediment having a high content of silt. Slopes are 0 to 2 percent.

In a representative profile, the surface layer is dark grayish-brown silt loam about 6 inches thick. The next layer extends to a depth of about 50 inches. It is dark-brown to dark yellowish-brown, friable silt loam in the upper part and yellowish brown mottled with light gray and pale brown in the lower part. The underlying material, to a depth of about 62 inches, is yellowish-brown loam that has light brownish-gray mottles.

***Figure 3.*—Field of grain sorghum on Calloway silt loam.**

Representative profile of Cascilla silt loam in a pasture 50 feet north of Bogue Creek and 75 feet east of gravel road, NW¼NW¼ sec. 21, T. 21 N., R. 6 E.

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) silt loam; weak, medium, granular structure; friable; common fine roots; few worm casts; slightly acid; abrupt, smooth boundary.

B21—6 to 22 inches, dark-brown (10YR 4/3) silt loam; few, fine, faint, brown (10YR 5/3) mottles; weak, medium, subangular blocky structure; friable; common fine roots; few worm casts; few, very thin, patchy clay films in pores; strongly acid; clear, smooth boundary.

B22—22 to 30 inches, dark yellowish-brown (10YR 4/4) silt loam; few, fine, faint, pale-brown (10YR 6/3) mottles and coatings; weak, medium, subangular blocky structure; friable; few roots; few, fine, soft, brown concretions; few, very thin, patchy clay films in pores; very strongly acid; clear, smooth boundary.

B23—30 to 38 inches, yellowish-brown (10YR 5/4) silt loam; few, medium, distinct, light-gray (10YR 7/2) mottles and few, medium, faint, pale-brown (10YR 6/3) mottles; weak, medium, subangular blocky structure; friable; few fine roots; few, fine, soft, brown concretions; very strongly acid; clear, smooth boundary.

B3—38 to 50 inches, yellowish-brown (10YR 5/6) silt loam; common, medium, distinct, light-gray (10YR 7/2) mottles and common, medium, faint, pale-brown (10YR 6/3) mottles; weak, medium, subangular blocky structure; friable; very strongly acid; clear, smooth boundary.

IIC—50 to 62 inches, yellowish-brown (10YR 5/6) loam; common, medium, distinct, light brownish-gray (10YR 6/2) mottles; structureless; friable; few very thin strata of silt loam at irregular intervals; strongly acid.

The A horizon ranges from dark grayish brown to grayish brown, dark brown, brown, dark yellowish brown, or yellowish brown. The B horizon is dark brown, brown, dark yellowish brown, or yellowish brown. Some profiles have few to many mottles in shades of brown and gray below a depth of 24 inches. The B horizon is silt loam. It ranges from 18 to 24 percent in content of clay and is less than 15 percent in content of fine and coarser sand. The C horizon is brown or yellowish-brown silt loam, loam, or fine sandy loam. Reaction is strongly acid or very strongly acid throughout, except where the surface layer has been limed.

Cascilla soils are associated with Ariel, Arkabutla, Chenneby, and Collins soils. Cascilla soils differ from Ariel soils in having a more clayey B horizon and lacking buried A&B horizons. They are better drained than Arkabutla, Chenneby, and Collins soils. They lack horizontal bedding planes, which Collins soils have.

Cascilla silt loam (Cc).—This is a well-drained soil on flood plains along stream channels. Slopes are 0 to 2 percent. This soil is flooded for short periods late in winter or early in spring, but crops are seldom damaged.

Included with this soil in mapping were small areas of Arkabutla and Chenneby soils.

Runoff is slow on this soil. Available water capacity is very high, and permeability is moderate. Reaction is strongly acid or very strongly acid.

Most of the acreage is cultivated or is used for pasture, but a small acreage is wooded. This soil is well

suited to cotton (fig. 4), corn, soybeans, small grains, pasture plants, and pine and hardwood trees.

This soil can be worked throughout a wide range of moisture content without clodding. Under good management, it can be used for row crops continuously. Crop residue that is shredded and left on the surface as a mulch helps to reduce crusting. In most fields some row arrangement and surface drains are needed to help remove excess water after rains. (Capability unit I–1; woodland group 1o7)

Chenneby Series

The Chenneby series consists of somewhat poorly drained soils that formed in loamy sediment having a high content of silt. Slopes are 0 to 2 percent.

In a representative profile, the surface layer is silt loam about 17 inches thick. The upper part of the surface layer is dark brown, and the lower part is dark yellowish brown and has light brownish-gray mottles. The next layer is silt loam that extends to a depth of about 65 inches. The upper 16 inches of this layer is yellowish brown and has light brownish-gray and gray mottles; the next 10 inches is mottled light brownish gray and brown; and the lower 22 inches is gray and has brownish mottles.

Representative profile of Chenneby silt loam in an area of Chenneby-Arkabutla association, in a large wooded area one-half mile north of the Big Black River bridge on State Route No. 407, and 400 feet east into woods, SW¼SE¼ sec. 25, T. 18 N., R. 6 E.

A11—0 to 8 inches, dark-brown (10YR 4/3) silt loam; weak, medium, granular structure; friable; many fine roots; few, fine, soft, black concretions; strongly acid; clear, smooth boundary.

A12—8 to 17 inches, dark yellowish-brown (10YR 4/4) silt loam; few, fine, distinct, light brownish-gray mottles; weak, medium, granular structure; friable; few fine roots; few, fine, soft, black concretions; strongly acid; clear, smooth boundary.

B1—17 to 24 inches, yellowish-brown (10YR 5/4) silt loam; common, fine, light brownish-gray (2.5Y 6/2) mottles; weak, fine and medium, subangular blocky structure; friable; few fine roots; few, fine and

Figure 4.**—Cotton that is ready for harvest on Cascilla silt loam.**

medium, black concretions; strongly acid; clear, smooth boundary.

B21—24 to 33 inches, yellowish-brown (10YR 5/4) silt loam; many, coarse, distinct, gray (10YR 6/1) and light brownish-gray (10YR 6/2) mottles; weak, fine and medium, subangular blocky structure; friable; few fine roots; few, fine, black and brown concretions; strongly acid; gradual, smooth boundary.

B22—33 to 43 inches, mottled light brownish-gray (2.5Y 6/2) and brown (10YR 5/3) silt loam; weak, fine and medium, subangular blocky structure; friable; few fine roots; few, fine, black and brown concretions; strongly acid; gradual, smooth boundary.

B23g—43 to 55 inches, light brownish-gray (2.5Y 6/2) silt loam; common, medium, distinct, yellowish-brown (10YR 5/4) mottles; weak, fine and medium, subangular blocky structure; friable; few fine roots; few, fine and medium, black concretions; strongly acid; gradual, smooth boundary.

B24g—55 to 65 inches, gray (10YR 6/1) silt loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, medium, subangular blocky structure; friable; few fine roots; common, fine and medium, black concretions; many pores; strongly acid.

The A horizon ranges from dark grayish-brown to grayish-brown, dark-brown, or dark yellowish-brown silt loam or silty clay loam. Some profiles have few to common mottles in shades of gray and brown in the lower part. The B horizon is silt loam or silty clay loam. The upper part of this horizon is brown, dark brown, dark yellowish brown, or yellowish brown and has common to many mottles of light brownish gray or gray. The lower part is mottled in shades of brown and gray or is light brownish gray or gray and has common to many mottles in shades of brown. Black and brown concretions range from few to common. Reaction is strongly acid or very strongly acid, except where the surface layer has been limed.

Chenneby soils are associated with Arkabutla and Cascilla soils. Chenneby soils are not so gray as Arkabutla soils, which are dominantly gray within a depth of 20 inches. They are not so well drained as Cascilla soils.

Chenneby-Arkabutla association (Ch).—This association is in large wooded areas on the flood plains along the Big Black River. It consists of somewhat poorly drained soils. Chenneby soils are in bands adjacent to former stream channels, and Arkabutla soils are on broad flats. The soils are flooded several times each year for periods ranging from 2 or 3 days to 3 weeks. Slopes are 0 to 2 percent. The composition of this mapping unit is more variable than most of the others in the county, but mapping was controlled well enough for the expected use of the soils.

Chenneby soils make up about 40 percent of this association, Arkabutla soils about 30 percent, and included soils the remaining 30 percent.

One of the Chenneby soils has the profile described as representative of the Chenneby series.

The Arkabutla soils have a surface layer of dark-brown silt loam about 8 inches thick. The next layer, to a depth of 15 inches, is brown, friable silt loam that has grayish mottles. Below this, to a depth of about 65 inches, is gray silt loam that has brownish mottles.

Included in mapping were areas of Cascilla, Collins, Gillsburg, and poorly drained soils.

Runoff is slow. Available water capacity is high in Chenneby soils and very high in Arkabutla soils. Permeability is moderate. Reaction is strongly acid or very strongly acid.

Almost all the acreage of this mapping unit is in hardwood forest. The soils are suited to hardwood and pine trees, but they are poorly suited to row crops because of the severe hazard of flooding. If flood control measures were installed, these soils would be suited to cotton, corn, soybeans, small grain, and pasture plants. (Capability unit IVw–1; woodland group 1w8)

Collins Series

The Collins series consists of moderately well drained soils that formed in loamy sediment having a high content of silt. Slopes are 0 to 2 percent.

In a representative profile, the surface layer is brown silt loam about 6 inches thick. The underlying material is friable silt loam to a depth of 50 inches. The upper 22 inches of this material is yellowish brown and has pale-brown and light brownish-gray mottles in the lower part; the next 9 inches is dark yellowish brown and has light brownish-gray mottles; and the lower 13 inches is mottled in shades of brown and gray.

Representative profile of Collins silt loam in a pasture 100 yards west of I-55 and 150 feet north of gravel road, SW¼SW¼ sec. 34, T. 19 N., R. 5 E.

Ap—0 to 6 inches, brown (10YR 5/3) silt loam; weak, medium, granular structure; friable; many roots; medium acid; clear, smooth boundary.

C1—6 to 13 inches, yellowish-brown (10YR 5/4) silt loam; few, medium, faint, pale-brown (10YR 6/3) mottles; structureless; friable; common roots; distinct bedding planes; very strongly acid; clear, smooth boundary.

C2—13 to 28 inches, yellowish-brown (10YR 5/4) silt loam; few, medium, faint, light brownish-gray (10YR 6/2) and pale-brown (10YR 6/3) mottles; structureless; friable; few fine roots; distinct bedding planes; very strongly acid; clear, smooth boundary.

C3—28 to 37 inches, dark yellowish-brown (10YR 4/4) silt loam; common, medium, distinct, light brownish-gray (10YR 6/2) mottles; structureless; friable; distinct bedding planes; few fine roots; very strongly acid; clear, smooth boundary.

C4—37 to 50 inches, mottled yellowish-brown (10YR 5/4), dark yellowish-brown (10YR 4/4), and light brownish-gray (10YR 6/2) silt loam; structureless; friable; few fine roots; distinct bedding planes; common black coatings between bedding planes; very strongly acid.

The A horizon ranges from grayish brown to brown, dark brown, or dark yellowish brown. The C horizon is brown, dark brown, yellowish brown, or dark yellowish brown. The upper 20 inches has few to common grayish mottles, but the lower part has common to many, gray or gray and brown mottles. The texture is silt loam or silt throughout. Reaction is strongly acid to very strongly acid throughout, except where the surface layer has been limed. Black and brown concretions range from none to few in the lower part.

Collins soils are associated with Bruno, Cascilla, and Gillsburg soils. Collins soils are less sandy than Bruno soils. They are not so well drained as Cascilla soils, and they have bedding planes, which Cascilla soils lack. Collins soils are browner and better drained than Gillsburg soils, but they lack a B horizon.

Collins silt loam (Cm).—This is a moderately well drained soil on flood plains. Slopes are 0 to 2 percent. This soil is flooded for short periods late in winter or early in spring. Slight or moderate crop damage can result if flooding occurs during the growing season.

Included with this soil in mapping were some small areas of Ariel and Cascilla soils. A few small sandy spots were also included.

Runoff is slow on this soil. Available water capacity is very high, and permeability is moderate. Reaction is strongly acid or very strongly acid.

Most of the acreage is cultivated or is used for pasture, but a small acreage is wooded. This soil is well suited to cotton, corn, soybeans, small grains, pasture plants, and pine and hardwood trees.

This soil can be worked throughout a wide range of moisture content without clodding. Under good management, it can be used for row crops continuously. Crop residue that is shredded and left on the surface as a mulch helps to reduce crusting. Use of row arrangement and surface field drains helps to remove excess water. Diversions are needed in some areas to intercept water from adjacent hills. (Capability unit IIw–2; woodland group 1o7)

Gillsburg Series

The Gillsburg series consists of somewhat poorly drained soils that formed in loamy sediment having a high content of silt. Slopes are 0 to 2 percent.

In a representative profile, the surface layer is dark-brown silt loam about 6 inches thick. The next layer, to a depth of about 12 inches, is yellowish-brown, friable silt loam that has light brownish-gray and pale-brown mottles. Below this layer, to a depth of 65 inches, is silt loam that is light brownish gray mottled in shades of brown in the upper part and mottled with shades of brown and gray in the lower part.

Representative profile of Gillsburg silt loam at one-half mile south of Grenada County line and one-fourth mile east of Lilac Community, SW¼NE¼ sec. 21, T. 21 N., R. 7 E.

Ap—0 to 6 inches, dark-brown (10YR 4/3) silt loam; common, medium, distinct, pale-brown (10YR 6/3) mottles; weak, medium, granular structure; friable; common fine roots; few worm casts; few, fine, black concretions; medium acid; abrupt, smooth boundary.

B21—6 to 12 inches, yellowish-brown (10YR 5/4) silt loam; common, medium, distinct, light brownish-gray (10YR 6/2) and pale-brown (10YR 6/3) mottles; weak, medium, subangular blocky structure; friable; few fine roots; ped faces coated with silt and oxides; few worm casts; common brown and black concretions; strongly acid; clear, smooth boundary.

B22—12 to 20 inches, light brownish-gray (10 YR 6/2) silt loam; common, medium, distinct, yellowish-brown (10YR 5/4) mottles and faint pale-brown (10YR 6/3) mottles; friable; few fine roots; ped faces coated with silt and oxides; common black and brown concretions; common fine pores; strongly acid; clear, irregular boundary.

A2b—20 to 42 inches, light brownish-gray (2.5Y 6/2) silt loam; many, medium, distinct, yellowish-brown (10YR 5/4) mottles; weak, medium and coarse, subangular blocky structure; friable, but slightly compact in brown part; few fine roots; tongues of light-gray silt between peds; common black and brown concretions; strongly acid; gradual, irregular boundary.

B21b&A2b—42 to 52 inches, mottled dark yellowish-brown (10YR 4/4), yellowish-brown (10YR 5/4), and light brownish-gray (2.5Y 6/2) silt loam; weak, medium and coarse, subangular blocky structure; friable, but slightly compact and brittle in brown part; few fine roots between peds; patchy clay films on prism faces; tongues of light-gray silt between peds; common black and brown concretions; strongly acid; gradual, irregular boundary.

B22tb—52 to 65 inches, mottled yellowish-brown (10YR 5/6), light brownish-gray (10YR 6/2), and pale-brown (10YR 6/3) silt loam; moderate, coarse, prismatic structure parting to weak, medium and coarse, subangular blocky; friable, but slightly compact and brittle in brown part; tongues of light-gray silt between prisms; patchy clay films on prism faces; few brown and black concretions; few fine voids; strongly acid.

The Ap horizon ranges from dark-brown to brown, dark grayish-brown, grayish-brown, or yellowish-brown silt loam or silt. The B21 horizon is brown, yellowish brown, or dark yellowish brown and has grayish mottles, or it is mottled in shades of brown and gray. The B22 horizon is light brownish gray or gray and has mottles in shades of brown. Reaction of the Ap and B horizons is strongly acid or very strongly acid, except where the surface layer has been limed. The A2b and B2b horizons are mottled in shades of brown and gray, or they have a grayish matrix and common to many brownish mottles. Reaction is strongly acid or very strongly acid. Black and brown concretions range from few to many.

Gillsburg soils are associated with Ariel, Arkabutla, Collins, and Guyton soils. Gillsburg soils have a grayer B horizon than Ariel soils and are not so well drained as those soils. They differ from Arkabutla soils in having a less clayey B horizon and buried A and B horizons. Gillsburg soils are not so well drained as Collins soils, and they do not have horizontal bedding planes that are present in Collins soils. Gillsburg soils are better drained than Guyton soils.

Gillsburg silt loam (Gb).—This is a somewhat poorly drained soil on flood plains and low terraces. Slopes are 0 to 2 percent. This soil is flooded for short periods in winter and early in spring. Slight or moderate crop damage results if floods occur during the growing season.

Included with this soil in mapping were a few small areas of Arkabutla and Guyton soils and a few areas where soil reaction is neutral below a depth of 3 feet.

Runoff is slow on this soil. Available water capacity is high, and permeability is moderately slow. Reaction is strongly acid or very strongly acid.

Most of the acreage is cultivated or is used for pasture, but a small acreage is wooded. This soil is suited to cotton (fig. 5), corn, soybeans, small grain, pasture plants, and pine and hardwood trees.

This soil can be worked throughout a moderate range of moisture content without clodding. Under good management, it can be used for row crops continuously. Crop residue that is shredded and left on the surface as a mulch helps to reduce crusting. Use of row arrangement and surface drains helps to remove excess surface water. In some areas diversions are needed to intercept water from adjacent hills. (Capability unit IIw–3; woodland group 2w9)

Grenada Series

The Grenada series consists of moderately well drained soils that have a fragipan. These soils formed in loamy material having a high content of silt. Slopes are 0 to 5 percent.

***Figure 5.*—Field of cotton on Gillsburg silt loam.**

In a representative profile, the surface layer is brown silt loam about 7 inches thick. The next layer, to a depth of about 25 inches, is yellowish-brown, friable silt loam that has pale-brown and light-gray mottles in the lower part. The next layer, to a depth of about 30 inches, is light-gray silt loam that has yellowish-brown mottles. Below this, to a depth of 60 inches, is a firm, compact, silt loam fragipan. The fragipan is mottled in shades of brown and gray in the upper part and is dark yellowish-brown and has light-gray and pale-brown mottles in the lower part.

Representative profile of Grenada silt loam, 0 to 2 percent slopes, in a pasture 1.3 miles south of the Grenada County line and one-fourth mile west of State Route 51, NE¼NE¼ sec. 26, T. 21 N., R. 5 E.

Ap—0 to 7 inches, brown (10YR 5/3) silt loam; many, medium, faint, pale-brown (10YR 6/3) mottles; weak, medium, granular structure; friable; common fine roots; few reddish stains around roots; medium acid; abrupt, smooth boundary.

B21—7 to 17 inches, yellowish-brown (10YR 5/6) silt loam; moderate, medium, subangular blocky structure; friable; few fine roots; few brown concretions; few worm casts; some material from Ap horizon in old worm channels; many fine pores; very strongly acid; clear, smooth boundary.

B22—17 to 25 inches, yellowish-brown (10YR 5/4) silt loam; common, medium, distinct, pale-brown (10YR 6/3) and light-gray (10YR 7/2) mottles; moderate, medium, subangular blocky structure; friable; few fine roots; common black and brown concretions; common coatings of pale-brown and light-gray silt coatings on some peds; many fine pores; very strongly acid; clear, wavy boundary.

A'2—25 to 30 inches, light-gray (10YR 7/2) silt loam; common, medium, distinct, yellowish-brown (10YR 5/4) mottles; weak, medium, subangular blocky structure; friable; many brown concretions; very strongly acid; clear, irregular boundary.

B'x1—30 to 40 inches, mottled strong-brown (7.5YR 5/6), dark yellowish-brown (10YR 4/4), and gray

(10YR 6/1) silt loam; moderate, coarse, prismatic structure parting to moderate, medium, subangular blocky; firm, compact and brittle; continuous clay films on some peds; light-gray silt in vertical seams and on prism faces; common, fine and medium, brown concretions; very strongly acid; clear, wavy boundary.

B'x2—40 to 53 inches, mottled dark yellowish-brown (10YR 4/4) and light-gray (10YR 7/2) silt loam; moderate, coarse, prismatic structure parting to moderate, medium, subangular blocky; firm, compact and brittle; thin clay films on peds; light-gray silt in vertical seams and on prism faces; few, fine and medium, brown concretions; very strongly acid; gradual, wavy boundary.

B'x3—53 to 60 inches, dark yellowish-brown (10YR 4/4) silt loam; common, medium, light-gray (10YR 7/2) and pale-brown (10YR 6/3) mottles; weak, coarse, prismatic structure parting to weak, coarse, subangular blocky; firm, compact and brittle; patchy clay films; coatings of light-gray silt on prism faces; common, fine and medium, brown concretions; very strongly acid.

The A horizon ranges from grayish brown to dark brown, brown, or dark yellowish brown. The upper part of the B2 horizon is yellowish brown or dark yellowish brown, and the lower part has similar matrix colors, but it also has few to common, light-gray mottles. This horizon is silt loam, and has a clay content ranging from 18 to 27 percent and a sand content of less than 10 percent. The A'2 horizon is pale-brown, light brownish-gray, or light-gray silt or silt loam and has few to many yellowish-brown mottles and remnants of the B horizon. The B'x horizon is silt loam or silty clay loam. It is brown, yellowish brown, or dark yellowish brown and has common to many gray mottles, or it is mottled in shades of brown and gray. Depth to the B'x horizon ranges from 20 to 30 inches. Black and brown concretions range from few to many. Reaction is medium acid to very strongly acid, except where the surface layer has been limed.

Grenada soils are associated with Calloway and Loring soils. Grenada soils are better drained than Calloway soils, and in the upper 16 inches of the profile, they do not have the grayish mottles that are present in those soils. Grenada soils have an A'2 horizon above the fragipan, but this horizon is missing in Loring soils.

Grenada silt loam, 0 to 2 percent slopes (GrA).—This is a moderately well drained soil on terraces and uplands. It has the profile described as representative of the series.

Included with this soil in mapping were small areas of Calloway, Loring, and Providence soils. Also included were a few spots that are moderately eroded.

Runoff is slow on this soil. Available water capacity is medium, and permeability is slow. Reaction is medium acid to very strongly acid.

Most of the acreage is cultivated or used for pasture, but a small acreage is wooded. This soil is suited to cotton, corn (fig. 6), soybeans, small grains, pasture plants, and hardwood and pine trees.

This soil can be worked throughout a moderate range of moisture content without clodding. Under good management, it can be used for row crops continuously. Crop residue that is shredded and left on

Figure 6.—Corn on Grenada silt loam, 0 to 2 percent slopes. The grassed waterway on the right helps remove excess surface water.

the surface as a mulch helps to reduce crusting. In most fields surface drainage can be provided by row arrangement. (Capability unit IIw–1; woodland group 3o7)

Grenada silt loam, 2 to 5 percent slopes, eroded (GrB2).—This is a moderately well drained soil on broad ridgetops and terraces. In most fields the surface layer has been thinned by erosion. Rills and gall spots are common, and part of the subsoil has been mixed into the plow layer.

The present surface layer is brown silt loam about 5 inches thick. The subsoil, between depths of 5 and 21 inches, is yellowish-brown silt loam. Between depths of 21 and 26 inches, is light-gray silt loam that has yellowish-brown mottles. Beneath this, to a depth of 52 inches, is a firm, compact and brittle silt loam fragipan. The fragipan is yellowish brown or dark yellowish brown and has common to many gray and light-gray mottles.

Included with this soil in mapping were a few areas that are severely eroded and a few that are slightly eroded. Also included were a few small areas of Loring and Providence soils.

Runoff is moderate on this soil. Available water capacity is medium, and permeability is slow. Reaction is medium acid to very strongly acid.

Most of the acreage is cultivated or is in pasture, but a small acreage is wooded. This soil is suited to cotton, corn, soybeans, pasture plants, and hardwood and pine trees.

This soil can be worked throughout a moderate range of moisture content without clodding. Crop residue that is shredded and left on the surface as a mulch helps to reduce crusting and packing. In cultivated fields erosion is a moderate hazard. If this soil is used for row crops, the rows should be arranged to conserve moisture and reduce erosion. Waterways and drainage outlets should be sodded with grass. A plowpan forms in places if the depth of plowing is not varied. (Capability unit IIe–1; woodland group 3o7)

Gullied Land

Gullied land consists of areas that have been so eroded that in many places the soil profile has been destroyed. In these severely eroded places, some less eroded soil remains between the gullied areas. Slopes are 5 to 25 percent.

The gullies range from about half an acre to several acres in size. Most of the gullies are between 2 and 10 feet deep, but a few are deeper. Most of the soil material washed from the gullies is loamy. The soils in the small areas between the gullies are mostly of the Providence series.

Gullied land-Providence complex, 5 to 25 percent slopes (GuF).—This complex consists of gullied areas throughout the county. Gullied land makes up about 70 percent of the complex, and Providence soils 20 percent. These are in areas so closely intermingled that they cannot be shown separately on the soil map. The Providence soils occupy small areas between the gullies and along the rim around the gullies. Included in mapping were areas of Loring and Smithdale soils that make up the remaining acreage.

The material in Gullied land is mainly loamy. The Providence soils have a surface layer of yellowish-brown silt loam about 1 inch thick. The subsoil is brown silty clay loam to a depth of about 22 inches. The underlying material, to a depth of 42 inches, is a loamy fragipan that is firm, compact and brittle. It is brown mottled with light brownish gray. Beneath the fragipan, between depths of 42 and 60 inches, is yellowish-red sandy loam.

Runoff is rapid on Gullied land and medium to rapid on the Providence soils. The hazard of erosion is very severe. Available water capacity is variable in Gullied land and medium in Providence soils. Permeability is variable in Gullied land and moderately slow in Providence soils. Reaction is strongly acid or very strongly acid in Gullied land and Providence soils.

This complex is better suited to pine trees than to other uses. (Capability unit VIIe–1; woodland group not assigned)

Guyton Series

The Guyton series consists of poorly drained soils that formed in loamy sediment having a high content of silt. Slopes are 0 to 2 percent.

In a representative profile, the surface layer is grayish-brown silt loam about 3 inches thick. The next layer, to a depth of about 23 inches, is friable silt loam. It is light brownish gray and has yellowish-brown mottles in the upper part and is gray and has grayish-brown mottles in the lower part. The next layer, to a depth of 60 inches, is gray silt loam that has brownish mottles.

Representative profile of Guyton silt loam at one-half mile south of Grenada County line and 450 feet west into woods, SE¼NW¼ sec. 23, T. 21 N., R. 5 E.

A1—0 to 3 inches, grayish-brown (10YR 5/2) silt loam; weak, medium, granular structure; friable; common fine and medium roots; few, fine, brown concretions; medium acid; abrupt, smooth boundary.

A21g—3 to 13 inches, light brownish-gray (10YR 6/2) silt loam; few, medium, distinct, yellowish-brown (10YR 5/4) mottles; weak, medium, subangular blocky structure; friable; few fine and medium roots; many fine pores; few, fine, brown concretions; strongly acid; clear, wavy boundary.

A22g—13 to 23 inches, gray (10YR 6/1) silt loam; common, medium, faint, grayish-brown (10YR 5/2) mottles; weak, medium, subangular blocky structure; friable, slightly compact; gray silt tongues extending into lower horizons; few, fine and medium, brown concretions; few fine roots; very strongly acid; clear, irregular boundary.

B2tg—23 to 48 inches, gray (10YR 6/1) silt loam; common, medium, faint, light brownish-gray (10YR 6/2) mottles and few, fine, distinct, yellowish-brown mottles; weak, coarse, subangular blocky structure; friable, slightly compact; discontinuous clay films on peds and in pores; few fine roots; few, medium brown concretions; tongues of material from A22g horizon; very strongly acid; clear, wavy boundary.

B3tg—48 to 60 inches, gray (10YR 6/1) silt loam; many, medium and coarse, distinct, yellowish-brown (10YR 5/6) mottles; weak, coarse, subangular blocky structure; firm; thin patchy clay films on peds; common, fine and medium, black and brown concretions; medium acid.

The A1 and Ap horizons range from grayish brown to dark grayish brown. The A2g horizon is light brownish gray, light gray, or gray and has brownish mottles. The A

horizon is slightly acid to very strongly acid. The B2tg and B3tg horizon is grayish-brown, gray, or light brownish-gray silt loam or silty clay loam that has brownish and grayish mottles. The B2tg horizon is strongly acid or very strongly acid. Black and brown concretions range from few to many throughout the soil.

Guyton soils are associated with Calloway and Gillsburg soils. Guyton soils are more poorly drained than Calloway soils, and they lack a fragipan, which Calloway soils have. Guyton soils are grayer near the surface and are more poorly drained than Gillsburg soils.

Guyton silt loam (Gy).—This is a poorly drained soil on flood plains and low terraces. Slopes are 0 to 2 percent. This soil is flooded in winter and spring. Moderate crop damage results if flooding occurs during the growing season.

Included with this soil in mapping were a few areas of Arkabutla and Gillsburg soils.

Runoff is slow. Available water capacity is very high, and permeability is very slow. Reaction is slightly acid to very strongly acid.

Most of the acreage is used for pasture. A small acreage is cultivated, and the rest is wooded. This soil is suited to soybeans, small grain, pasture plants, and pine and hardwood trees, but it is poorly suited to cotton and corn.

Because of soil wetness in spring, seedbed preparation and planting are often delayed. Crop residue that is shredded and left on the surface as a mulch helps to reduce crusting. In cultivated areas row arrangement and field drains are needed to help remove excess surface water. (Capability unit IIIw–2; woodland group 2w9)

Iuka Series

The Iuka series consists of moderately well drained soils that formed in loamy sediment. Slopes are 0 to 2 percent.

In a representative profile, the surface layer is brown fine sandy loam about 5 inches thick. The underlying material, to a depth of about 25 inches, is sandy loam. It is yellowish brown in the upper part and dark yellowish brown in the lower part. Below this, to a depth of 48 inches, is silt loam that is mottled light yellowish brown and light brownish gray in the upper part and is gray and has brown mottles in the lower part.

Representative profile of Iuka fine sandy loam in a cultivated field 2½ miles southwest of Lodi, SW¼NE¼ sec. 10, T. 19 N., R. 7 E.

Ap—0 to 5 inches, brown (10YR 4/3) fine sandy loam; weak, fine, granular structure; very friable; few fine roots; medium acid; clear, smooth boundary.

C1—5 to 14 inches, thinly bedded yellowish-brown (10YR 5/4) sandy loam and loam; common, medium, faint, pale-brown (10YR 6/3) mottles; structureless; very friable; few fine roots; strongly acid; clear, smooth boundary.

C2—14 to 25 inches, dark yellowish-brown (10YR 4/4) sandy loam; few, medium, faint, pale-brown (10YR 6/3) and light brownish-gray (10YR 6/2) mottles; evident bedding planes; structureless; friable; few roots; strongly acid; clear, smooth boundary.

C3—25 to 35 inches, mottled light yellowish-brown (10YR 6/4) and light brownish-gray (10YR 6/2) silt loam; evident bedding planes; structureless; friable; few, medium, black and brown concretions and black stains; few roots; strongly acid; clear, smooth boundary.

C4g—35 to 48 inches, gray (10YR 6/1) silt loam; few, medium, distinct, brown (10YR 5/3) mottles; structureless (massive); friable; few, fine, black concretions; strongly acid.

The Ap horizon ranges from brown to yellowish brown. The C horizon is brown, yellowish brown, dark yellowish brown, light yellowish brown, pale brown, grayish brown, or brownish yellow and has mottles of gray or light brownish gray. Below a depth of 20 inches the matrix ranges from dominantly brown mottled with gray to dominantly gray, and the texture is sandy loam, silt loam, or loam. The horizons range from uniform to alternating layers of contrasting material in arrangement. Between depths of 10 and 40 inches, the soil material contains less than 10 percent clay and more than 15 percent sand that is coarser than very fine sand. Black and brown concretions range from none to common in the lower part of the profile. Reaction is strongly or very strongly acid, except where the surface layer has been limed.

Iuka soils are associated with Brewton and Bruno soils. Iuka soils are better drained than Brewton soils and have fine stratification that is lacking in Brewton soils. Iuka soils are less sandy than Bruno soils and are not so well drained as those soils.

Iuka fine sandy loam (Iu).—This is a moderately well drained soil on flood plains. Slopes are 0 to 2 percent. This soil is flooded for short periods late in winter or early in spring. Slight or moderate crop damage results if flooding occurs during the growing season.

Included with this soil in mapping were small areas of Bruno and Collins soils.

Runoff is slow on this soil. Available water capacity is high, and permeability is moderate. Reaction is strongly acid to very strongly acid, except where the surface layer has been limed.

Most of the acreage is cultivated or is used for pasture, but a small acreage is wooded. This soil is suited to cotton, corn, soybeans, small grains, pasture plants, and pine and hardwood trees.

This soil can be worked throughout a wide range of moisture content without clodding. Under good management, it can be used for row crops continuously. Crop residue that is shredded and left on the surface as a mulch helps reduce crusting. In most fields surface drains and row arrangement are needed to provide surface drainage. (Capability unit IIw–2; woodland group 1w8)

Loring Series

The Loring series consists of moderately well drained soils that have a fragipan. These soils formed in loamy material having a high content of silt. Slopes are 2 to 8 percent.

In a representative profile, the surface layer is silt loam, about 5 inches thick, that is dark grayish brown in the upper 2 inches and yellowish brown in the lower 3 inches. The next layer, which extends to a depth of 27 inches, is strong-brown, friable silty clay loam in the upper part and dark-brown, friable silt loam in the lower part. Below this layer, to a depth of about 48 inches, is a firm, compact and brittle fragipan. The fragipan is silt loam that is dark yellowish brown in the upper part and dark brown in the lower part. It is mottled in shades of gray and brown. Be-

neath this layer, to a depth of about 60 inches, is dark-brown, friable silt loam that is mottled in shades of gray and brown.

Representative profile of Loring silt loam, 5 to 8 percent slopes, eroded, in a pasture 1.3 miles south of the Grenada County line and one-half mile west of State Route 51, SW¼NE¼ sec. 26, T. 21 N., R. 5 E.

Ap1—0 to 2 inches, dark grayish-brown (10YR 4/2) silt loam; few, fine and medium, distinct, strong-brown (7.5YR 5/6) mottles; weak, medium, granular structure; friable; common fine roots; few worm casts and insect channels; slightly acid; clear, smooth boundary.

Ap2—2 to 5 inches, yellowish-brown (10YR 5/4) silt loam; few, medium, faint, pale-brown (10YR 6/3) and strong-brown (7.5YR 5/6) mottles; weak, medium, granular structure and weak, medium, subangular blocky; friable; common fine roots; few worm casts; slightly acid; abrupt, smooth boundary.

B21t—5 to 18 inches, strong-brown (7.5YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; friable; common fine roots; continuous clay films on peds; few worm casts; very strongly acid; clear, smooth boundary.

B22t—18 to 27 inches, dark-brown (7.5YR 4/4) silt loam; few, fine, distinct, pale-brown mottles; moderate, medium, subangular blocky structure; friable; few fine roots; patchy clay films on peds; few, fine and medium, black concretions; very strongly acid; clear, smooth boundary.

Bx1—27 to 38 inches, dark yellowish-brown (10YR 4/4) silt loam; common, medium, distinct, light brownish-gray (10YR 6/2) mottles and few, medium, distinct, strong-brown (7.5YR 5/6) mottles; weak, coarse, prismatic structure parting to moderate, medium, subangular blocky; firm, compact and brittle; patchy clay films on peds; few roots between prisms; coatings of gray silt between prisms; few fine voids; few, fine, black concretions; very strongly acid; gradual, wavy boundary.

Bx2—38 to 48 inches, dark-brown (7.5YR 4/4) silt loam; many, medium, distinct, light brownish-gray (10YR 6/2), yellowish-brown (10YR 5/6), and pale-brown (10YR 6/3) mottles; weak, coarse, prismatic structure parting to moderate, medium, subangular blocky; firm, compact and brittle; few patchy clay films on peds; few black concretions; few fine voids; very strongly acid; gradual, wavy boundary.

B3t—48 to 60 inches, dark-brown (7.5YR 4/4) silt loam; few, medium, distinct, light brownish-gray (10YR 6/2) and pale-brown (10YR 6/3) mottles; weak, medium, subangular blocky structure; friable; few patchy clay films; gray silt coatings; very strongly acid.

The A horizon ranges from dark grayish brown to grayish brown, brown, dark yellowish brown, or yellowish brown. The B2t horizon is dark-brown or strong-brown silty clay loam or silt loam. In some places it has few to many brownish mottles in the lower part. The Bx horizon is dark brown, strong brown, or dark yellowish brown and has common to many mottles in shades of gray and brown. Depth to the fragipan ranges from 22 to 32 inches. Reaction ranges from medium acid to very strongly acid throughout, except where the surface layer has been limed.

Loring soils are associated with Grenada and Providence soils. In contrast to Grenada soils, Loring soils have a Bt horizon above the fragipan but lack an A'2 horizon. They have less sand in the lower part of the profile than Providence soils.

Loring silt loam, 2 to 5 percent slopes, eroded (LoB2).—This is a moderately well drained soil on broad upland ridges. In most fields the original surface layer has been thinned by erosion and mixed with part of the subsoil to form the present plow layer.

The surface layer is brown silt loam about 5 inches thick. The next layer, extending to a depth of 29 inches, is dark-brown silty clay loam in the upper part and dark-brown silt loam in the lower part. Beneath this layer, to a depth of about 60 inches, is a firm, compact and brittle fragipan. The fragipan is dark-brown silt loam and has light brownish-gray mottles.

Included with this soil in mapping were small areas of Providence soils. Also included were some areas that are slightly eroded.

Runoff is medium on this soil. Available water capacity is medium to high, and permeability is moderately slow. Reaction is medium acid or strongly acid.

Most of the acreage is cultivated or is used for pasture, but a small acreage is wooded. This soil is suited to cotton, corn, soybeans, small grain, pasture plants, and pine and hardwood trees.

This soil can be cultivated throughout a moderate range of moisture content without clodding. Under good management, it can be used for row crops continuously. Crop residue that is shredded and left on the surface as a mulch helps to reduce crusting and packing. Erosion is a moderate hazard in cultivated fields. If this soil is used for row crops, the rows should be arranged to conserve moisture and reduce erosion. Waterways and outlets should be sodded with grass. (Capability unit IIe–1; woodland group 3o7)

Loring silt loam, 5 to 8 percent slopes, eroded (LoC2).—This is a moderately well drained soil on ridges of broad to medium width. It has the profile described as representative of the series. In most fields the original surface layer has been thinned by erosion and mixed with some of the subsoil to form the present plow layer.

Included with this soil in mapping were areas that are slightly eroded and some areas that are severely eroded. Also included were a few small areas of Providence soils.

Runoff is medium on this soil. Available water capacity is medium to high, and permeability is moderately slow. Reaction is medium acid to strongly acid.

Most of the acreage is cultivated or is used for pasture, but a small acreage is wooded. This soil is suited to cotton, corn, soybeans, small grain, pasture plants, and pine and hardwood trees.

This soil can be worked throughout a moderate range of moisture content without clodding. Crop residue that is shredded and left on the surface as a mulch helps to reduce crusting. In cultivated fields erosion is a hazard. If this soil is used for row crops, terraces and rows should be arranged to conserve moisture and reduce erosion. Waterways and outlets should be sodded with grass. (Capability unit IIIe–1; woodland group 3o7)

Mashulaville Series

The Mashulaville series consists of poorly drained soils that have a fragipan. These soils formed in loamy sediment. Slopes are 0 to 2 percent.

In a representative profile, the surface layer is gray fine sandy loam, about 8 inches thick, that has light brownish-gray mottles. The next layer, to a depth of about 22 inches, is gray, friable loam that has light yellowish-brown mottles. Beneath this layer, to a depth of about 50 inches, is a firm, compact and brittle fragipan. It is light brownish-gray loam that has brownish mottles in the upper part and is loam mottled in shades of gray and brown in the lower part.

Representative profile of Mashulaville fine sandy loam in a pasture 6 miles east of Duck Hill and one-half mile west of State Route 404, NE¼SW¼ sec. 25, T. 21 N., R. 6 E.

Ap—0 to 8 inches, gray (10YR 5/1) fine sandy loam; few, fine, faint, light brownish-gray mottles; weak, medium, granular structure; friable; few fine roots; strongly acid; abrupt, smooth boundary.

A21g—8 to 22 inches, gray (10YR 6/1) loam; few, medium, distinct, light yellowish-brown (10YR 6/4) mottles; weak, medium, granular structure; friable; few, fine, brown concretions; few fine roots; strongly acid; clear, smooth boundary.

A22x—22 to 27 inches, light brownish-gray (10YR 6/2) loam; common, medium, faint, light-gray (10YR 7/1) mottles; weak, medium, subangular blocky structure; firm; compact and brittle; few, fine, brown concretions; strongly acid; clear, smooth boundary.

Bx1—27 to 37 inches, light brownish-gray (10YR 6/2) loam; few, medium, distinct, light yellowish-brown (2.5YR 6/4) mottles; weak, medium, subangular blocky structure; firm, compact and brittle; few thin clay films on peds; few, fine, brown concretions; strongly acid; clear, smooth boundary.

Bx2—37 to 50 inches, mottled gray (10YR 6/1), light yellowish-brown (2.5Y 6/4), and strong-brown (7.5YR 5/6) loam; weak, medium, subangular blocky structure; firm; compact and brittle; many brown concretions; few thin clay films on peds; very strongly acid.

The Ap horizon ranges from dark grayish brown to grayish brown, gray, or light brownish gray. The A2g horizon is gray, light-gray, or light brownish-gray loam or fine sandy loam that has brownish and grayish mottles. The Bx horizon has colors similar to the A2g horizon but is mottled in shades of brown. Dark concretions range from none to common in the Ap horizon and few to many in the other horizons. Reaction is strongly acid or very strongly acid throughout.

Mashulaville soils are associated with Brewton and Calloway soils. Mashulaville soils are grayer and not so well drained as Brewton soils, which lack a fragipan. Mashulaville soils are not so well drained as Calloway soils, which have less than 15 percent fine to coarse sand in the B horizon.

Mashulaville fine sandy loam (Ma).—This is a poorly drained soil on flood plains and low terraces. Slopes are 0 to 2 percent. This soil is flooded in winter and spring, and the water table is at or near the surface during wet periods.

Included with this soil in mapping were a few small areas of Brewton soils and a few areas where the surface layer is silt loam.

Runoff is slow on this soil. Available water capacity is low, and permeability is slow. Reaction is strongly acid or very strongly acid.

Most of the acreage is used for pasture or woodland. This soil is suited to pasture plants and to pine and hardwood trees, but it is poorly suited to the crops commonly grown in the county. (Capability unit IVw-2; woodland group 3w9)

Providence Series

The Providence series consists of moderately well drained soils that have a fragipan. These soils formed in loamy material having a high content of silt. Slopes are 2 to 25 percent.

In a representative profile, the surface layer is dark yellowish-brown silt loam about 4 inches thick. The next layer is about 25 inches thick. The upper 8 inches of this layer is yellowish-red, friable silty clay loam; the next 8 inches is strong-brown, friable silty clay loam; and the lower 9 inches is dark-brown, friable silt loam. Below this, to a depth of about 57 inches, is a firm, compact and brittle fragipan. The upper part of the fragipan is dark yellowish-brown silt loam that has light brownish-gray mottles, and the lower part is dark yellowish-brown loam that has light brownish-gray mottles. The underlying material, to a depth of 65 inches, is yellowish-brown sandy loam that has light-gray mottles.

Representative profile of Providence silt loam, 5 to 8 percent slopes, 3¼ miles south of Sweatman, NE¼-NE¼ sec. 20, T. 20 N., R. 7 E.

Ap—0 to 4 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, medium, granular structure; friable; common fine roots; strongly acid; abrupt, smooth boundary.

B21t—4 to 12 inches, yellowish-red (5YR 5/6) silty clay loam; moderate, fine and medium, subangular blocky structure; friable; many clay films on peds; common fine roots; very strongly acid; clear, smooth boundary.

B22t—12 to 20 inches, strong-brown (7.5YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; friable; many clay films on peds; few roots; strongly acid; clear, wavy boundary.

B23t—20 to 29 inches, dark-brown (7.5YR 4/4) silt loam; common, medium, faint, pale-brown (10YR 6/3) mottles; moderate, medium, subangular blocky structure; friable; common clay films on peds; few, fine and medium, black concretions; few roots; very strongly acid; clear, wavy boundary.

Bx1—29 to 42 inches, dark yellowish-brown (10YR 4/4) silt loam; many, medium, distinct, light brownish-gray (10YR 6/2) mottles; weak, coarse, prismatic structure parting to moderate, medium, subangular blocky; firm, compact and brittle; many clay films on peds; coatings of light brownish-gray silt between prisms; few roots in cracks; few, fine, black concretions; very strongly acid; clear, smooth boundary.

IIBx2—42 to 57 inches, dark yellowish-brown 10YR 4/4) loam; common, medium, distinct, light brownish gray (10YR 6/2) mottles; weak, coarse, prismatic structure parting to weak, medium, subangular blocky; firm, compact and brittle; common fine pores; common thick clay films on peds; strongly acid; clear, smooth boundary.

IIC—57 to 65 inches, yellowish-brown (10YR 5/6) sandy loam; few, fine, distinct, light-gray mottles; structureless; friable; strongly acid.

The A1 horizon ranges from dark grayish brown to grayish brown. The A2 horizon is brown, pale brown, or yellowish brown. The Ap horizon is grayish brown, brown, dark yellowish brown, or strong brown. The Bt horizon is strong-brown, yellowish-brown, dark-brown, or yellowish-red silt loam or silty clay loam that has a clay content of 22 to 30 percent and a sand content of from 5 to 15 per-

cent. Depth to the Bx horizon ranges from 18 to 32 inches. This horizon has matrix colors similar to those in the Bt horizon but is mottled with shades of gray. The IIBx horizon is yellowish-brown to yellowish-red sandy loam or loam to clay loam. The IIC horizon is yellowish brown to red sandy loam to clay loam that has grayish mottles. Reaction is strongly acid or very strongly acid throughout.

Providence soils are associated with Loring, Smithdale, and Sweatman soils. Providence soils have more sand in the lower part of the profile than Loring soils. They are less sandy than Smithdale soils and less clayey than Sweatman soils, and they have a fragipan, which is lacking in Smithdale and Sweatman soils.

Providence silt loam, 2 to 5 percent slopes, eroded (PrB2).—This is a moderately well drained soil on upland ridgetops of broad to medium width. In most fields the original surface layer has been thinned by erosion.

The surface layer is yellowish-brown silt loam about 5 inches thick. The next layer, which extends to a depth of about 24 inches, is strong-brown silty clay loam in the upper part and yellowish-brown silt loam in the lower part. Below this layer, to a depth of 52 inches, is a fragipan. The fragipan is dark-brown silt loam that has grayish mottles in the upper part and is yellowish-brown loam that has grayish mottles in the lower part.

Included with this soil in mapping were some areas that are only slightly eroded, a few small areas of Loring soils, and a few areas that have a clayey layer below the fragipan.

Runoff is medium on this soil. Available water capacity is medium to high, and permeability is moderately slow. Reaction is strongly acid to very strongly acid.

Most of the acreage is cultivated or is used for pasture. This soil is suited to cotton, corn, soybeans, small grain, pasture plants, and pine and hardwood trees.

This soil can be worked throughout a moderate range of moisture content without clodding. Crop residue that is shredded and left on the surface as a mulch helps to reduce crusting and packing. In cultivated fields, erosion is a moderate hazard. If this soil is used for row crops, the rows should be arranged to reduce erosion and conserve moisture. Waterways and outlets should be sodded with grass. (Capability unit IIe–1; woodland group 3o7)

Providence silt loam, 5 to 8 percent slopes (PrC).—This is a moderately well drained, sloping soil on ridges and upland ridgetops of medium width. It has the profile described as representative of the series.

Included with this soil in mapping were areas that are eroded, a few small areas of Loring soils, and a few areas that have a clayey layer below the fragipan.

Runoff is medium on this soil. Available water capacity is medium to high, and permeability is moderately slow. Reaction is strongly acid to very strongly acid.

Most of the acreage is used for pasture, some of it is cultivated, and a small acreage is wooded. This soil is suited to cotton, corn, soybeans, small grain, and pine and hardwood trees.

This soil can be worked throughout a moderate range of moisture content without clodding. Crop residue that is shredded and left on surface as a mulch helps to reduce crusting. In cultivated fields, erosion is a severe hazard. If this soil is used for row crops, the rows and terraces should be arranged to reduce erosion and conserve moisture. Waterways and outlets should be sodded with grass. (Capability unit IIIe–1; woodland group 3o7)

Providence silt loam, 5 to 8 percent slopes, severely eroded (PrC3).—This is a moderately well drained, sloping soil on upland ridges. The subsoil is exposed in most places. Rills and shallow gullies have formed in many places, and one or two deep gullies have formed in a few places.

The surface layer is dark yellowish-brown silt loam about 3 inches thick. The next layer, which extends to a depth of about 26 inches, is strong-brown silty clay loam in the upper part and strong-brown silt loam in the lower part. Beneath this layer, to a depth of about 52 inches, is a fragipan. The fragipan is dark yellowish-brown silt loam in the upper part and yellowish-red clay loam in the lower part. Grayish mottles are common throughout the fragipan.

Included with this soil in mapping were a few areas that have a clayey layer below the fragipan, a few small areas of Loring soils, and a few small gullied areas.

Runoff is medium on this soil. Available water capacity is medium to high, and permeability is moderately slow. Reaction is strongly acid to very strongly acid.

Most of the acreage is in pasture, some areas are cultivated, and a few areas are in pine trees. This soil is suited to cotton, corn, soybeans, small grain, pasture plants, and pine trees.

This soil should not be cultivated every year. It should be in sod crops at least three-fourths of the time. In cultivated fields, erosion is a severe hazard. Crusts form on the surface after rains. If row crops are grown, rows and terraces should be on the contour to reduce erosion and conserve moisture. Waterways and outlets should be sodded with grass. (Capability unit IVe–1; woodland group 3o7)

Providence silt loam, 8 to 12 percent slopes, eroded (PrD2).—This is a moderately well drained soil on upland side slopes. The surface layer has been thinned by erosion, and in some places rills have formed and exposed the subsoil.

The surface layer is yellowish-brown silt loam about 4 inches thick. The next layer, to a depth of about 20 inches, is strong-brown silty clay loam. Below this layer is a fragipan that extends to a depth of about 31 inches. This fragipan is strong-brown silt loam that has grayish mottles in the upper part and yellowish-red sandy loam that has grayish mottles in the lower part. The fragipan is underlain, to a depth of about 60 inches, by yellowish-red, friable sandy loam.

Included with this soil in mapping were a few areas of Smithdale soils, a few areas of Loring soils, and some areas that are only slightly eroded.

Runoff is rapid on this soil. Available water capacity is medium to high, and permeability is moderately slow. Reaction is strongly acid to very strongly acid.

Most of the acreage is in pasture and woodland. This soil is suited to pasture plants and to pine and hardwood trees, but it is poorly suited to row crops.

Because the soil has strong slopes and surface runoff is rapid, erosion is a severe hazard in cultivated fields. Perennial plants should be grown on this soil as much of the time as possible. This soil should not be used for row crops more than 1 year out of 4. If row crops are grown, terraces and rows should be on the contour and waterways and outlets should be sodded with grass. (Capability unit IVe–2; woodland group 3o7)

Providence silt loam, 8 to 12 percent slopes, severely eroded (PrD3).—This is a moderately well drained, sloping soil on upland ridges. The subsoil is exposed in most places. Rills and shallow gullies have formed in many places, and one or two deep gullies have formed in a few places.

The surface layer is grayish-brown silt loam about 1 inch thick. The next layer extends to a depth of about 19 inches. The upper part is strong-brown silty clay loam, and the lower part is dark-brown silt loam. Below this layer, to a depth of about 48 inches, is a fragipan. The fragipan is strong-brown silt loam in the upper part and yellowish-red loam in the lower part. Grayish mottles are common throughout the fragipan.

Included with this soil in mapping were a few areas of Loring soils, a few areas of Smithdale soils, and a few small gullied areas.

Runoff is rapid on this soil. Available water capacity is medium to high, and permeability is moderately slow. Reaction is strongly acid to very strongly acid.

Most of the acreage is in pasture or woodland. This soil is suited to pasture plants and pine trees, but it is not suited to cultivated crops.

Because erosion is a hazard, this soil should be in permanent pasture or woodland. (Capability unit VIe–1; woodland group 3o7)

Smithdale Series

The Smithdale series consists of well-drained soils that formed in loamy material. Slopes are 8 to 45 percent.

In a representative profile, the surface layer is sandy loam about 11 inches thick. It is dark grayish-brown in the upper 4 inches and brown in the lower 7 inches. The next layer is yellowish-red, friable sandy clay loam to a depth of about 38 inches; yellowish-red, friable sandy loam to a depth of 52 inches; and red sandy loam to a depth of 80 inches.

Representative profile of Smithdale sandy loam, in an area of Smithdale-Providence association, hilly, at three-fourths mile east of Big Black River on State Route 407 and 50 feet north into woods, SE¼SW¼ sec. 31, T. 18 N.; R. 7 E.

A1—0 to 4 inches, dark grayish-brown (10YR 4/2) sandy loam; weak, fine and medium, granular structure; very friable; common fine roots; strongly acid; clear, smooth boundary.

A2—4 to 11 inches, brown (10YR 5/3) sandy loam; weak, medium, granular structure; very friable; few fine roots; strongly acid; clear, smooth boundary.

B21t—11 to 38 inches, yellowish-red (5YR 4/6) sandy clay loam; moderate, fine and medium, subangular blocky structure; friable; few fine roots; common thin clay films on peds; strongly acid; clear, smooth boundary.

B22t—38 to 52 inches, yellowish-red (5YR 5/6) sandy loam; weak, medium, subangular blocky structure; friable; sand grains coated and bridged with clay and oxides; few fine quartz pebbles; few fine mica flakes; strongly acid; clear, wavy boundary.

B23t—52 to 80 inches, red (2.5YR 5/6) sandy loam; weak, medium, subangular blocky structure; very friable; sand grains bridged and coated with clay and oxides; few pockets of uncoated sand grains; few fine quartz pebbles; few fine mica flakes; strongly acid.

The A1 horizon is very dark grayish-brown, dark grayish-brown, or brown sandy loam or fine sandy loam. The A2 horizon is brown, pale-brown, yellowish-brown, or light yellowish-brown sandy loam or fine sandy loam. The Ap horizon is dark-brown, brown, yellowish-brown, and, in severely eroded areas, yellowish-red fine sandy loam, sandy loam, or loam. The upper part of the Bt horizon is yellowish-red or red clay loam, sandy clay loam, or loam. It has a clay content of 18 to 35 percent in the upper 20 inches. The lower part of the Bt horizon is yellowish-red or red loam or sandy loam. Reaction is strongly acid or very strongly acid.

Smithdale soils are associated with Providence, Sweatman, and Tippah soils. Smithdale soils are more sandy in the upper part of the profile than Providence soils and lack the fragipan of those soils. They are less silty than Tippah soils and are less clayey than Sweatman soils.

Smithdale-Providence association, hilly (SpE).—This association is on rough, hilly uplands. It consists of well drained Smithdale soils and moderately well drained Providence soils. The Smithdale soils are mainly on the steeper side slopes that are broken by many short drainageways. The Providence soils are mainly on the narrow ridgetops and, in some places, are on the upper parts of the side slopes. Slopes are 8 to 35 percent. The composition of this association is more variable than that of most other mapping units in the county, but mapping was controlled well enough for the expected use of the soils.

Smithdale soils make up about 59 percent of this association, Providence soils about 18 percent, and included soils the remaining 23 percent.

One of the Smithdale soils has the profile described as representative of the Smithdale series.

The Providence soils have a surface layer of silt loam, about 6 inches thick, that is dark grayish brown in the upper 2 inches and is brown in the lower 4 inches. The next layer, reaching to a depth of 27 inches, is strong-brown silty clay loam in the upper part and strong-brown silt loam in the lower part. Below this layer is a fragipan about 25 inches thick. The fragipan is dark yellowish-brown silt loam in the upper part and dark-brown loam in the lower part. It contains common light brownish-gray mottles throughout. It is underlain by yellowish-red sandy loam that extends to a depth of about 73 inches.

Included in mapping were areas of Sweatman soils, Tippah soils, loamy soils that have a sandy surface layer 20 to 40 inches thick, and Iuka soils in narrow drainageways. Also included were a few areas of eroded soils.

Runoff is rapid, and the hazard of erosion is very severe. Available water capacity is medium in the Smithdale soils and medium to high in the Providence soils. Permeability is moderate in the Smithdale soils and moderately slow in the Providence soils. Reaction

is strongly acid or very strongly acid in the Smithdale and Providence soils.

Almost all of the acreage of this association is wooded. The soils are better suited to pines and hardwoods than to other plants. They are poorly suited to crops and pasture plants because of slope and the very severe hazard of erosion. (Capability unit VIIe–2; Smithdale soil in woodland group 3o1; Providence soil in woodland group 3o7)

Smithdale-Providence complex, 8 to 17 percent slopes, severely eroded (SrE3).—This complex is on uplands. It consists of well drained Smithdale soils and moderately well drained Providence soils. The Smithdale soils are mainly on the middle and lower parts of the side slopes. The Providence soils are mainly on narrow ridgetops and on the upper parts of side slopes. These soils occur in intricate patterns and lie adjacent to each other in narrow bands; for these reasons, they are mapped together.

Smithdale soils make up about 48 percent of this complex, Providence soils about 28 percent, and included soils the remaining 24 percent.

The Smithdale soils have a surface layer of brown fine sandy loam about 2 inches thick. Below the surface layer, to a depth of about 30 inches, is yellowish-red, friable sandy clay loam. The next layer, extending to a depth of about 60 inches, is yellowish-red sandy loam. Beneath this is red sandy loam that reaches to a depth of about 80 inches.

The Providence soils have a surface layer of yellowish-brown silt loam about 2 inches thick. The next layer extends to a depth of about 23 inches. It is strong-brown, friable silty clay loam in the upper part and is dark yellowish-brown, friable silt loam in the lower part. Below this layer, and extending to a depth of about 60 inches, is a brittle fragipan that is yellowish-brown silt loam in the upper part and strong-brown loam in the lower part. The fragipan has common gray mottles throughout.

Included in mapping were areas of Loring, Tippah, and Sweatman soils. Also included were areas of soils that are not severely eroded, some areas where slopes are more than 17 percent, a few gullied areas, and a few areas where gullies were smoothed.

Runoff is rapid, and the hazard of erosion is very severe. In most areas erosion has removed the original surface layer of these soils, and in many places rills and shallow gullies have been formed. Available water capacity is medium in the Smithdale soils and medium to high in the Providence soils. Permeablity is moderate in the Smithdale soils and moderately slow in the Providence soils. Reaction is strongly acid or very strongly acid in the Smithdale and Providence soils.

Most of the acreage of these soils was once cleared and cultivated, but about half of it is now used for pasture, and the rest is wooded. These soils are suited to pasture plants and to pines. They are poorly suited to crops because of slope and the very severe hazard of erosion. They are better used for permanent pasture or as woodland than for most other uses. (Capability unit VIe–1; woodland group 3o1)

Smithdale-Sweatman-Providence association, hilly (SsE).—This association is on rough, hilly uplands. It consists of well drained Smithdale and Sweatman soils and moderately well drained Providence soils. The steeper Smithdale soils are on the upper and middle parts of side slopes. The steeper Sweatman soils generally are on the middle and lower parts of side slopes. The less sloping Providence soils are mainly on narrow ridgetops and, in some places, are on the upper parts of side slopes. Slopes are 12 to 45 percent. The side slopes are broken by many short drainageways. The composition of this association is more variable than that of most other mapping units in the county, but mapping was controlled well enough for the expected use of the soils.

Smithdale soils make up about 33 percent of this association, Sweatman soils about 32 percent, Providence soils about 18 percent, and included soils the remaining 17 percent.

The Smithdale soils have a surface layer of fine sandy loam about 11 inches thick. It is dark grayish brown in the upper 2 inches and is yellowish brown in the lower 9 inches. The next layer is red, friable sandy clay loam about 34 inches thick. Below this layer is red sandy loam that extends to a depth of about 80 inches.

The Sweatman soils have a surface layer of fine sandy loam about 5 inches thick. It is dark grayish brown in the upper 2 inches and brown in the lower 3 inches. The next layer is yellowish-red, firm clay about 28 inches thick. Below this layer is red, friable clay loam, about 12 inches thick, that is underlain by stratified shale and loamy materials to a depth of about 60 inches.

The Providence soils have a surface layer of silt loam about 6 inches thick. It is grayish brown in the upper 2 inches and is yellowish brown in the lower 4 inches. The next layer extends to a depth of about 33 inches. It is strong-brown, friable silty clay loam in the upper part and dark-brown, friable silt loam in the lower part. Below this layer is a brittle fragipan about 27 inches thick. The fragipan is strong-brown silt loam in the upper part and strong-brown loam in the lower part. It contains many light brownish-gray mottles throughout. Below it is yellowish-red sandy loam.

Included in mapping were areas of Tippah soils, loamy soils that are underlain by shale at a depth of about 30 inches, and loamy soils that formed in alluvium in narrow drainageways. Also included were a few areas of eroded soils and a few areas of soils that are less than 20 inches deep to shale.

Runoff is rapid, and the hazard of erosion is very severe. Available water capacity is medium in the Smithdale soils, high in the Sweatman soils, and medium to high in the Providence soils. Permeability is moderate in the Smithdale soils and moderately slow in the Sweatman and Providence soils. Reaction is strongly acid or very strongly acid.

Almost all the acreage of this association is wooded. The soils are better suited to pines and hardwoods than to most other plants. They are poorly suited to cultivated crops and pasture plants because of slope and the very severe hazard of erosion. They should be kept in trees permanently. (Capability unit VIIe–2;

Smithdale soil in woodland group 3o1; Sweatman soil in woodland group 3c2; Providence soil in woodland group 3o7)

Sweatman Series

The Sweatman series consists of well-drained soils that formed in stratified clayey and loamy material over shale. Slopes are 8 to 45 percent.

In a representative profile, the surface layer is dark-brown silt loam about 2 inches thick. The next layer extends to a depth of 44 inches. The upper 12 inches of this layer is yellowish-red, firm silty clay; the next 25 inches is red, firm clay that is mottled in shades of gray, red, and yellow in the lower part; and the lower 5 inches is strong-brown silty clay mottled with shades of red and gray. The underlying material, to a depth of about 60 inches, is light brownish-gray shale.

Representative profile of Sweatman silt loam, in an area of Tippah-Sweatman complex, 8 to 12 percent slopes, eroded, 1 mile east of Sweatman and 330 feet south of gravel road, NE¼NE¼ sec. 4, T. 20 N., R. 7 E.

Ap—0 to 2 inches, dark-brown (10YR 4/3) silt loam; weak, fine, granular structure; friable; common fine roots; strongly acid; abrupt, smooth boundary.

B21t—2 to 14 inches, yellowish-red (5YR 4/8) silty clay; moderate, medium, subangular blocky structure; firm, few fine roots; few fine ironstone fragments; continuous clay films on some peds; strongly acid; clear, smooth boundary.

B22t—14 to 24 inches, red (2.5YR 4/6) clay; strong, medium, angular blocky structure; firm; continuous clay films on peds; few soft ironstone fragments; common strong-brown coatings on some peds; few roots; very strongly acid; gradual, smooth boundary.

B23t—24 to 33 inches, red (10R 4/6) clay; common, medium, prominent, pale-brown (10YR 6/3) mottles; moderate, fine, angular blocky structure; firm; few roots; common, fine, gray shale fragments; few small ironstone fragments; continuous clay films on some peds; very strongly acid; gradual, smooth boundary.

B24t—33 to 39 inches, mottled red (10R 4/6), gray (10YR 6/1), and reddish-yellow (7.5YR 6/6) clay; moderate, fine, angular blocky structure; firm; few fine roots; continuous clay films on some peds; very strongly acid; gradual, smooth boundary.

B3—39 to 44 inches, strong-brown (7.5YR 5/8) silty clay; many, large, distinct, gray (10YR 6/) and many, large, prominent, red (10R 4/6) mottles; weak platy structure; firm; few roots; few mica flakes; some partly weathered shale; very strongly acid; gradual, smooth boundary.

C—44 to 60 inches, light brownish-gray (2.5Y 6/2) shale; platy rock structure; firm; few roots in cracks; extremely acid.

The A horizon ranges from grayish brown to dark grayish brown or very dark grayish brown. The Ap horizon is dark-brown, brown, yellowish-brown, or dark yellowish-brown fine sandy loam, loam, or silt loam. The B2t horizon ranges from yellowish-red to red clay or silty clay to clay loam. The lower part of the horizon either has a matrix color and mottles in shades of gray and yellow or it is entirely mottled. In the upper 20 inches of the B2t horizon, the clay content ranges from 35 to 55 percent and the silt content is more than 20 percent. The B3 horizon, if present, is red, yellowish red, or strong brown and has gray mottles, or it is entirely mottled. It consists of a mixture of material in the original B horizon and partly weathered material from the C horizon. The C horizon is shale or stratified sand, clay, and shale. Reaction is strongly acid to very strongly acid above the shale. The solum ranges from 20 to about 50 inches in thickness.

Sweatman soils are associated with Providence, Smithdale, and Tippah soils. They are more clayey in the Bt horizon than Providence and Smithdale soils, and they lack the fragipan of the Providence soils. Sweatman soils are more clayey in the upper part of the Bt horizon than Tippah soils.

Sweatman and Smithdale soil, 17 to 30 percent slopes, severely eroded (StF3).—This mapping unit occurs on rough uplands that have been cleared and cultivated. The soils are well drained. Sweatman and Smithdale soils occur together without regularity of pattern. Some areas consist of either Sweatman soils or Smithdale soils, but most areas contain both soils.

Sweatman soils make up about 43 percent of this mapping unit, Smithdale soils about 33 percent, and included soils the remaining 24 percent.

Sweatman soils have a surface layer of brown silt loam about 2 inches thick. The next layer extends to a depth of about 40 inches. It is yellowish-red, firm silty clay in the upper part and red, firm silty clay that has grayish mottles in the lower part. This layer is underlain by shale to a depth of about 60 inches.

Smithdale soils have a surface layer of yellowish-red loam about 4 inches thick. Beneath the surface layer is yellowish-red, friable sandy clay loam about 17 inches thick. Below this is yellowish-red sandy loam that extends to a depth of about 80 inches.

Included in mapping were small areas of Providence and Tippah soils, as well as soils that have a loamy subsoil and are underlain by shale at a depth of about 30 inches. Also included were a few areas where gullies were smoothed and some areas where slopes are less than 17 percent.

Runoff is rapid, and the hazard of erosion is very severe. Most of the surface layer has been removed by erosion. Rills and shallow gullies have formed, and in places, some deep gullies have formed. Available water capacity is high in Sweatman soils and medium in Smithdale soils. Permeability is moderately slow in Sweatman soils and moderate in Smithdale soils. Reaction is strongly acid to very strongly acid.

Most areas of these soils are in pine trees. A small acreage is used for pasture. The soils are suited to pine trees, but most areas are too steep for cultivated crops and pasture. They should be permanently wooded. (Capability unit VIIe-2; Sweatman soils in woodland group 4c2; Smithdale soils in woodland group 3o1)

Tippah Series

The Tippah series consists of moderately well drained soils that formed in loamy material having a high content of silt and in underlying clayey sediment. Slopes are 8 to 12 percent.

In a representative profile, the surface layer is dark-brown silt loam about 3 inches thick. The next layer is 19 inches of dark-brown, friable and firm silty clay loam; 23 inches of plastic clay that is mottled in

shades of red, brown, and gray; and 15 inches of light-gray, plastic clay that has reddish mottles.

Representative profile of Tippah silt loam, in an area of Tippah-Sweatman complex, 8 to 12 percent slopes, eroded, in a pasture three-fourths mile northeast of Lodi, SE¼NE¼ sec. 36, T. 20 N., R. 7 E.

Ap—0 to 3 inches, dark-brown (7.5YR 4/4) silt loam; weak, medium, subangular blocky structure; friable; many fine roots; strongly acid; clear, smooth boundary.

B21t—3 to 12 inches, dark-brown (7.5YR 4/4) silty clay loam; moderate, medium subangular blocky structure; friable; common clay films on peds; few fine roots; strongly acid; clear, smooth boundary.

B22t—12 to 22 inches, dark-brown (7.5YR 4/4) silty clay loam; common, medium, distinct, pale-brown (10YR 6/3) mottles; moderate, medium, subangular blocky structure; firm; many thick clay films on peds; few light-gray silt coatings; few fine roots; strongly acid; clear, smooth boundary.

IIB23t—22 to 29 inches, mottled yellowish-red (5YR 4/6), yellowish-brown (10YR 5/4), and gray (10YR 6/1) clay; moderate, medium, angular and subangular blocky structure; plastic; many thick clay films on peds; few roots; strongly acid; clear, smooth boundary.

IIB24t—29 to 45 inches, mottled red (2.5YR 5/6) and gray (10YR 6/1) clay; few, medium, distinct, yellowish-brown (10YR 5/6) mottles; moderate, fine, angular blocky structure; plastic; thick clay films on peds; few roots; strongly acid; clear, smooth boundary.

IIB25t—45 to 60 inches, light-gray (10YR 7/1) clay; common, medium, prominent, red (2.5YR 5/6) mottles; moderate, fine and medium, angular and subangular blocky structure; plastic; few roots; strongly acid.

The A1 horizon ranges from dark grayish brown to grayish brown; the A2 horizon is brown or yellowish brown; and the Ap horizon is brown, dark brown, or dark yellowish brown. The Bt horizon is strong-brown, dark-brown, or yellowish-red silt loam or silty clay loam. The clay content is 24 to 35 percent. The IIBt horizon is silty clay or clay mottled in shades of brown, red, and gray. Depth to the IIBt horizon ranges from 20 to 45 inches. Reaction is medium acid to very strongly acid throughout.

Tippah soils are associated with Smithdale and Sweatman soils. Tippah soils are more silty than Smithdale soils, and they are less clayey in the upper part of the Bt horizon than Sweatman soils.

Tippah-Sweatman complex, 8 to 12 percent slopes, eroded (TsD2).—This complex is on uplands. The moderately well drained Tippah soils are mainly on the ridgetops and the upper parts of side slopes. The well drained Sweatman soils are mainly on the middle and lower parts of side slopes. The soils of this complex occur in an intricate pattern, and they lie adjacent to each other in narrow bands. For these reasons, they were mapped together.

Tippah soils make up about 48 percent of the complex, Sweatman soils about 37 percent, and included soils the remaining 15 percent.

One of the Sweatman soils has the profile described as representative of the Sweatman series. Included in mapping were areas of Providence soils and areas of unnamed soils that have a loamy subsoil and are underlain by shale at a depth of about 30 inches.

Runoff is rapid, and the hazard of erosion is severe. Erosion has thinned the surface layer, and in some places rills and shallow gullies have been formed. Available water capacity is high. Permeability is very slow in Tippah soils and moderately slow in Sweatman soils. Reaction is medium acid to very strongly acid in Tippah soils and strongly acid to very strongly acid in Sweatman soils.

Most of the acreage was once cleared and cultivated, but it is now in pasture or woodland. These soils are suited to pasture plants and to pine and hardwood trees, but they are poorly suited to row crops. Perennial plants should be grown as much of the time as possible, and the soils should not be used for row crops for more than 1 year in 4. Rows should be on the contour where row crops are grown, and waterways and outlets should be sodded with grass. (Capability unit IVe–2; woodland group 3o7)

Use and Management of the Soils

This section discusses the management of crops and pasture and explains the system of capability grouping used by the Soil Conservation Service. Estimated yields of the principal crops are given. Also discussed are the use of soils for woodland and wildlife habitat. Properties and features affecting the use of soils for engineering and limitations affecting town and country planning are listed, mainly in tables.

Management of Crops and Pastures [2]

The general management principles needed for most soils that are used for crops and pasture in Montgomery County are those that maintain or increase yields, conserve soil moisture, and control erosion.

Some soils cannot be used continuously for crops, because the erosion hazard is so severe. Cropping systems that include sod crops or dense ground cover are needed to protect the surface layer from erosion between periods of cultivation. Such factors as soil texture, degree of slope, and past erosion determine the time that the soils can be used for clean-tilled row crops and the intervals when sod or cover crops are needed.

Most soils in Montgomery County have medium or low natural fertility, and plant response to fertilizer and lime is generally good. Crop residue that is shredded and left on the surface helps to control erosion, increase infiltration of water, and maintain the organic-matter content.

On sloping soils of the uplands, terraces or stripcropping and contour rows to control runoff and erosion are needed in many places. For example, on Loring silt loam, 5 to 8 percent slopes, eroded, these practices are needed. Runoff from terraces or rows should be discharged into vegetated or grassed waterways. Natural water courses are generally better than other waterways.

Many of the soils on flood plains are subject to periodic flooding. On such soils as these, artificial drainage measures are generally required to remove excess surface water. Among these measures are main and lateral ditches or surface field ditches. Arkabutla silt loam is an example of a soil where these practices are

[2] WILLIAM M. LIPE, conservation agronomist, Soil Conservation Service, helped prepare this section.

needed. Diversions are an effective means of intercepting excess runoff from adjacent upland areas.

The soils in Montgomery County are suited to many pasture plants. Timely and adequate application of fertilizer increases forage production and subsequently the carrying capacity of pasture. Regulation of grazing is essential for adequate soil cover and sustained plant growth. Weeds and brush should be controlled.

Capability grouping

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The soils are grouped according to their limitations when used for field crops, the risk of damage when they are so used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops requiring special management.

Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for range, for forest trees, or engineering.

In the capability system, the kinds of soils are grouped at three levels: the capability class, subclass, and unit. These are discussed in the following paragraphs.

CAPABILITY CLASSES, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use.

CAPABILITY SUBCLASSES are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by *w*, *s*, and *c*, because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, range, woodland, wildlife habitat, or recreation.

CAPABILITY UNITS are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-1 or IIIe-1. Thus, in one symbol, the Roman numeral designates the capability class or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph; and the Arabic numeral specifically identifies the capability unit within each subclass.

The soils in Montgomery County have been placed in 17 capability units. The soils in each unit have about the same limitations, are subject to similar risks of damage, need about the same kind of management, Their management is discussed in the descriptions of and respond to management in about the same way. the mapping units in the section "Descriptions of the Soils." To determine the names of the soils in a capability unit refer to the "Guide to Mapping Units" at the back of this survey.

The capability classes, subclasses, and units in Montgomery County are as follows:

Class I soils have few limitations that restrict their use.

- Unit I-1. Nearly level, well-drained, loamy soils; on flood plains.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

- Subclass IIe soils are subject to moderate erosion if they are not protected.
    - Unit IIe-1. Gently sloping, moderately well drained, loamy soils that have a fragipan; on uplands.
- Subclass IIw soils have moderate limitations because of excess water.
    - Unit IIw-1. Nearly level, moderately well drained, loamy soils that have a fragipan; on terraces and uplands.
    - Unit IIw-2. Nearly level, well drained and moderately well drained, loamy soils; on flood plains.
    - Unit IIw-3. Nearly level, somewhat poorly drained, loamy soils; on flood plains and low terraces.
    - Unit IIw-4. Nearly level, somewhat poorly drained, loamy soils; on terraces.

Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

- Subclass IIIe soils are subject to severe erosion if they are not protected.
    - Unit IIIe-1. Sloping, moderately well drained, loamy soils that have a fragipan; on uplands.
- Subclass IIIw soils have severe limitations because of excess water.
    - Unit IIIw-1. Nearly level, somewhat poorly drained, loamy soils; on low terraces and uplands.
    - Unit IIIw-2. Nearly level, poorly drained, loamy soils; on flood plains and low terraces.
- Subclass IIIs soils have severe limitations caused by droughtiness.
    - Unit IIIs-1. Nearly level, excessively drained, sandy soils; on flood plains.

Class IV soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

Subclass IVe soils are subject to very severe erosion if they are not protected.

Unit IVe–1. Sloping, moderately well drained, severely eroded, loamy soils that have a fragipan; on uplands.

Unit IVe–2. Sloping, moderately well drained, loamy soils that have a fragipan and well drained soils that have a clayey subsoil; on uplands.

Subclass IVw soils have very severe limitations because of excess water.

Unit IVw–1. Nearly level, somewhat poorly drained, loamy soils that are frequently flooded; on flood plains.

Unit IVw–2. Nearly level, poorly drained, loamy soils that have a fragipan; on flood plains and low terraces.

Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife habitat.

Subclass VIe soils are subject to severe limitations because of erosion.

Unit VIe–1. Sloping to moderately steep, severely eroded, well drained, loamy soils and moderately well drained, loamy soils that have a fragipan.

Class VII soils have very severe limitations that make them unsuited to cultivation and restrict their use largely to pasture or range, woodland, or wildlife habitat.

Subclass VIIe soils are subject to severe limitations because of erosion.

Unit VIIe–1. Sloping to steep, severely gullied land and moderately well drained, loamy soils that have a fragipan; on uplands.

Unit VIIe–2. Moderately steep to steep, well-drained, loamy soils; soils that have a clayey subsoil; and moderately well drained, loamy soils that have a fragipan; on uplands.

Estimated yields

Table 2 shows, for the arable soils in the county, the estimated average yields per acre of commonly grown crops. The estimates are those that can be expected under a high level of management without irrigation. This level of management includes (1) making timely applications of lime and fertilizer in the kinds and amounts indicated by soil tests; (2) using good tillage practices; (3) managing crop residue well; (4) planting crop varieties that are suited to the soils; and (5) applying the management practices discussed in the section "Management of Crops and Pasture" and in the descriptions of mapping units in the section "Descriptions of the Soils." Yields are not shown for soils in Montgomery County that are generally not used for crops and pasture.

The yields shown in table 2 are based on estimates by agronomists, soil scientists, and others who have had much experience with crops and soils in Montgomery County. Data for yields obtained on experimental plots were adjusted to reflect the combined effect of slope and level of management. If such data were not available, estimates were made by using data for similar soils.

Use of the Soils for Woodland [3]

This section contains information that can be used by woodland owners, foresters, and farmers in developing and carrying out plans for profitable tree farming. It discusses the influence of soils on the growth of trees.

In addition to being a reservoir of moisture for a tree, soil provides all the essential elements required for growth except those derived from the atmosphere, carbon from carbon dioxide and oxygen. It also provides the medium in which a tree is anchored. The many characteristics of soil, such as chemical composition, texture, structure, depth, and position, affect the growth of a tree to the extent to which they affect the supply of moisture and nutrients. A number of studies have shown a strong correlation between the productivity of a site, or the growth of trees, and various soil characteristics, such as depth and position on the slopes. The relationships are often indirect. The water- and nutrient-supplying ability of a soil is strongly related to its texture and structure, as well as to its depth. Coarse-textured soils, or sands, are low in nutrient content and in available water capacity. Aeration is impeded in clay soils, particularly during wet periods, so that metabolic processes requiring oxygen in the roots are inhibited. In clay soils percolation of water into the soil and soil aeration are favored by aggregated soil particles. Silvicultural practices that prevent the destruction of organic matter and the compaction of soil provide for better conditions of soil moisture and aeration (*4*).

Of the total land area of 257,920 acres in Montgomery County, approximately 62 percent, or 159,700 acres (*8*), is classified as commercial forest. In 1967 there were 50.7 million cubic feet of pine and 60.3 million cubic feet of hardwoods growing in Montgomery County. Also in 1967, the volume of sawtimber totaled 312.9 million board feet, of which 144.2 million board feet was pine and 168.7 million board feet was hardwoods (*6*).

The number of forest fires recorded in Montgomery County in the 5-year period from July 1, 1966, to June 30, 1971, averaged 24, and 249 acres burned annually.[4] Forest fire protection is provided by the Mississippi Forestry Commission.

Forest types

Stands of trees that cover a considerable area are classified as forest types according to the kinds and proportion of trees making up such stands. A forest type is generally given the name or names of the trees

[3] THOMAS M. NORTON, forester, Soil Conservation Service, helped prepare this section.

[4] Data furnished by HOLLIS SMITH, forester, Mississippi Forestry Commission.

TABLE 2.—*Estimated average yields per acre of principal crops under a high level of management*

[Absence of data indicates crop is not commonly grown on the particular soil]

Soil	Cotton (lint)	Corn	Soybeans	Pasture			
				Coastal bermudagrass	Fescue	Bahiagrass	Common bermudagrass
	Lb.	*Bu.*	*Bu.*	*A.U.M.*[1]	*A.U.M.*[1]	*A.U.M.*[1]	*A.U.M.*[1]
Ariel silt loam	800	90	35	12.0	10.0	10.5	8.0
Arkabutla silt loam	700	95	35	12.0	10.0	10.0	7.5
Brewton fine sandy loam	650	60	35	8.0	8.0	7.0	6.0
Bruno soils	400	45		5.0		5.0	4.0
Calloway silt loam	650	80	30	9.5	8.0	8.0	6.5
Cascilla silt loam	850	95	40	12.0	10.0	11.0	9.0
Chenneby-Arkabutla association			30	8.5	8.0	8.0	6.0
Collins silt loam	800	95	35	10.0	9.0	10.0	8.0
Gillsburg silt loam	650	90	35	10.0	9.0	10.0	7.5
Grenada silt loam, 0 to 2 percent slopes	625	80	35	9.5	8.5	9.0	7.0
Grenada silt loam, 2 to 5 percent slopes, eroded	600	75	35	9.5	8.0	9.0	6.0
Gullied land-Providence complex, 5 to 25 percent slopes							
Guyton silt loam	400	30	20	6.0	6.0	6.0	5.0
Iuka fine sandy loam	800	90	35	9.0	8.0	8.5	7.0
Loring silt loam, 2 to 5 percent slopes, eroded	700	90	35	9.5	8.5	9.0	7.5
Loring silt loam, 5 to 8 percent slopes, eroded	650	70	25	9.5	7.0	8.5	7.0
Mashulaville fine sandy loam			20	4.5	7.0	7.0	4.5
Providence silt loam, 2 to 5 percent slopes, eroded	700	80	35	9.5	8.5	9.0	6.5
Providence silt loam, 5 to 8 percent slopes	650	70	30	9.0	7.0	8.5	6.0
Providence silt loam, 5 to 8 percent slopes, severely eroded	500	50	25	8.5	6.0	8.0	6.0
Providence silt loam, 8 to 12 percent slopes, eroded	500	50	25	9.0	6.5	8.0	6.5
Providence silt loam, 8 to 12 percent slopes, severely eroded				8.0	5.5	7.5	6.0
Smithdale-Providence association, hilly							
Smithdale-Providence complex, 8 to 17 percent slopes, severely eroded				8.0	5.5	8.0	5.0
Smithdale-Sweatman-Providence association, hilly							
Sweatman and Smithdale soils, 17 to 30 percent slopes, severely eroded							
Tippah-Sweatman complex, 8 to 12 percent slopes, eroded				8.0	7.0	8.0	5.5

[1] A.U.M. is animal-unit-month, a term used to express the carrying capacity of pasture. It is the number of animal units per acre a pasture can carry each month without injury to the sod. An acre of pasture that provides 1 month of grazing for 1 cow, 1 horse, 5 sheep, or 5 goats has a carrying capacity of 1 animal-unit-month.

most abundant in the stand. In this county there are four forest types, which are mainly in natural stands.

The hardwoods cover a total of 67,700 acres. Among them are 57,200 acres of the oak-hickory forest type and 10,500 acres of the bottom land hardwoods forest type. The bottom land hardwoods type consists mainly of oak, gum, and baldcypress, but there are a few isolated stands of elm, ash, and cottonwood.

The softwoods cover a total of 92,000 acres. Among them are 38,400 acres of the loblolly-shortleaf pine forest type and 53,600 acres of the oak-pine forest type. The loblolly-shortleaf pine type consists mainly of shortleaf pine, generally in almost pure, natural stands. There are few, if any, natural stands of loblolly pine, but the stands that have been planted on most of the plantations are pure.

Trees that are used for sawtimber and that are more numerous and widely distributed are shortleaf pine, hickory, red oak, sweetgum, white oak, and ash. There are also yellow-poplar, sycamore, elm, and blackgum, but these trees are of minor importance. In 1966 the net annual growth of softwood trees used for sawtimber was 9.7 million board feet, and 2.7 million board feet was cut. The net annual growth of hardwood trees used for sawtimber was 11 million board feet, and 9 million board feet (*5*) was cut.

Woodland groups

A woodland group is made up of kinds of soil that are capable of producing similar kinds of wood crops, that need the same management, and that have about the same potential productivity. The factors considered are such soil characteristics as depth, color, drainage, and wetness (*7*). The numbering system and the group symbols are explained in the following paragraphs.

The first element of the group symbol is a numeral that indicates the woodland class. This numeral expresses site quality, which ranges from 1 to 4, and is based on the average site index of one or more indicator forest types of tree species. Soils in class 1 have the highest potential productivity, followed by those in classes 2, 3, and 4. The indicator species are shown in italics in table 3.

TABLE 3.—*Woodland groups and*

Woodland group	Soil series and map symbol	Potential productivity	
		Species [1]	Site index
			Feet
Group 1o7: Well drained and moderately well drained soils on flood plains. Moderate to moderately slow permeability; very high available water capacity.	Ariel, Ar; Cascilla, Cc; Collins, Cm.	Eastern cottonwood Cherrybark oak *Water oak* Loblolly pine Sweetgum	110 100 100 90 100
Group 1w8: Somewhat poorly drained and moderately well drained soils on flood plains. Moderate permeability; high to very high available water capacity.	Arkabutla, At; Chenneby and Arkabutla parts of Ch; Iuka, Iu.	Eastern cottonwood Cherrybark oak Loblolly pine *Sweetgum*	110 110 90 100
Group 2s5: Excessively drained soils on flood plains. Moderately rapid permeability; low available water capacity.	Bruno, Bu.	Water oak Willow oak Sweetgum	90 90 100
Group 2w8: Somewhat poorly drained soils on uplands and terraces. Slow permeability; medium available water capacity.	Brewton, Br; Calloway, Ca.	Cherrybark oak Water oak *Loblolly pine* *Sweetgum*	90 90 90 90
Group 2w9: Somewhat poorly drained and poorly drained soils. Moderately slow to very slow permeability; high to very high available water capacity.	Gillsburg, Gb; Guyton, Gy.	Loblolly pine Sweetgum Cherrybark oak Water oak	90 90 90 90
Group 3o1: Well-drained soils on uplands. Moderate permeability; medium available water capacity.	Smithdale part of SpE, SrE3, SsE, and StF3, and Providence part of SrE3.	*Loblolly pine* Shortleaf pine	80 70
Group 3o7: Moderately well drained soils on uplands. Moderately slow to very slow permeability; medium to high available water capacity.	Grenada, GrA, GrB2; Loring, LoB2, LoC2; Providence, PrB2, PrC, PrC3, PrD2, PrD3, and Providence part of SpE and SsE; Tippah and Sweatman parts of TsD2.	Cherrybark oak Water oak Loblolly pine Shortleaf pine Sweetgum	90 80 80 70 80
Group 3c2: Well-drained soils on uplands. Slow permeability; high available water capacity.	Sweatman part of SsE.	Loblolly pine Shortleaf pine	80 70
Group 3w9: Poorly-drained soils. Slow permeability; low available water capacity.	Mashulaville, Ma.	Water oak *Loblolly pine* Shortleaf pine Sweetgum	80 80 70 80
Group 4c2: Severely eroded, well-drained soils on uplands. Slow permeability; high available water capacity.	Sweatman part of StF3.	*Loblolly pine*	70

[1] Indicator species are in italics.

The second element in the symbol is a small letter that indicates the subclass. This letter indicates the selected soil properties that result in moderate to severe hazards of limitations in the use or management of woodland.

Subclass o (slight or no limitations).—Soils that have no significant restrictions or limitations for woodland use or management.

Subclass c (clayey soils).—Soils having restrictions or limitations for woodland use or management because of the kind or amount of clay in the upper part of the soil profile.

Subclass s (sandy soils).—Soils having moderate to severe restrictions or limitations for woodland use or management. They impose limitations on equipment. They have little or no B horizon, have low available water capacity, and normally are low in available plant nutrients.

Subclass w (excessive wetness).—Soils in which excessive water, either seasonally or year around, causes significant limitations to use or management of woodland. These soils have restricted drainage, have a high water table, or are flooded, and consequently development or management of the stand is adversely affected.

Some kinds of soil have more than one set of subclass characteristics. Priority in placing each kind of soil into a subclass is in the order *o*, *c*, *s*, and *w*.

The third element of the symbol is a numeral that indicates the degree of hazard or limitation and the general suitability of the soils for certain kinds of trees. The three management problems considered are

factors in woodland management

Hazards and limitations			Preferred species
Erosion hazard	Equipment limitation	Seedling mortality	
Slight	Slight	Slight	Eastern cottonwood, cherrybark oak, water oak, loblolly pine, sweetgum, and sycamore.
Slight	Moderate	Slight	Eastern cottonwood, cherrybark oak, loblolly pine, sweetgum, and sycamore.
Slight	Moderate	Moderate	Cherrybark oak, Shumard oak, sweetgum, sycamore, and yellow-poplar.
Slight	Moderate	Slight	Cherrybark oak, Shumard oak, sweetgum, and yellow-poplar.
Slight	Severe	Moderate	Loblolly pine, sweetgum, and sycamore.
Slight	Slight	Slight	Loblolly pine and shortleaf pine.
Slight	Slight	Slight	Cherrybark oak, water oak, loblolly pine, shortleaf pine, and sweetgum.
Slight	Moderate	Slight to moderate	Loblolly pine and shortleaf pine.
Slight	Severe	Severe	Shumard oak, loblolly pine, and sweetgum.
Moderate	Moderate	Moderate	Loblolly pine.

erosion hazard, equipment restrictions, and seedling mortality.

The numeral 1 indicates soils that have none to slight management limitations and that are well suited to needleleaf trees.

The numeral 2 indicates soils that have one or more moderate management limitations and that are well suited to needleleaf trees.

The numeral 3 indicates soils that have one or more severe management limitations and that are well suited to needleleaf trees. (Not used in this county.)

The numeral 4 indicates soils that have none to slight management limitations and that are well suited to broadleaf trees. (Not used in this county.)

The numeral 5 indicates soils that have one or more moderate management limitations and that are well suited to broadleaf trees.

The numeral 6 indicates soils that have one or more severe management limitations and that are well suited to broadleaf trees. (Not used in this county.)

The numeral 7 indicates soils that have none to slight management limitations and that are suited to needleleaf or broadleaf trees.

The numeral 8 indicates soils that have one or more moderate management limitations and that are suited to needleleaf or broadleaf trees.

The numeral 9 indicates soils that have one or more severe management limitations and that are suited to needleleaf or broadleaf trees.

Factors affecting woodland management

The soils of Montgomery County have been rated on the basis of their performance when used to produce wood crops. The ratings are used to summarize the soil-related limitations (*6*). They are based on actual tree measurements as well as on information collected by teams of soil scientists and foresters and further supported by published data and research information. Table 3 shows the woodland groups and the factors that affect woodland management. Gullied land was not placed in a woodland group and is not listed in table 3, but it has potential for the production of loblolly and shortleaf pines, which are the preferred species. It is made up of severely gullied areas on uplands. Permeability and available water capacity are variable. The hazard of erosion, seedling mortality, and the limitation to use of equipment are also variable.

Some of the column heads are explained in the following paragraphs.

Potential productivity is expressed as a site index. The site index is the average height, in feet, of the dominant trees at age 50 years for most species, but at age 30 for cottonwoods and at age 35 for sycamores. The site indexes are based on soil-woodland correlation studies and other available research data (*3*). They are rounded off to the nearest 10-foot interval for the most important species. They are listed in table 3 under potential productivity. For some species the estimated site indexes have been recorded, but for others the estimates are based on comparisons with the same species on a similar soil or with another species on the same soil.

Erosion hazard is the degree of potential soil erosion. Ratings are based on the risk of erosion expected on well-managed woodland. These ratings are further related to differences in soil stability and permeability, slope, surface runoff, water storage capacity, and disturbances of vegetation. A rating of *slight* indicates that problems of erosion control are not important and that only a small loss of soil is expected. Generally, erosion hazard is slight if the slopes range from 0 to 2 percent and runoff is slow or very slow. Erosion hazard is *moderate* where a medium soil loss is expected unless runoff is controlled and adequate plant cover for protection of soil is maintained. In this case some attention must be given to prevent unnecessary soil erosion. Erosion hazard is *severe* where slopes are steep, runoff is rapid, and soils show evidence of past erosion. In such cases, intensive treatments and special methods of operation must be planned and specialized equipment used to minimize soil erosion.

Equipment limitation was rated on the basis of the characteristics of the soil that limit or prohibit the use of equipment commonly used in woodland operations, such as felling, bucking, skidding, loading, and hauling. Consideration was also given to special equipment used in spraying, tree planting, direct seeding, and firefighting. Ratings are based on such physical soil characteristics as texture, stability, and plasticity and are also related to slope, wetness, and the presence or absence of stones, ledges, and other obstructions.

Equipment limitation was rated *slight* if the use of equipment was not limited in kind or time of year. The rating was *moderate* if the use of equipment was limited to a medium degree in kind of operations by one or more of the following factors: moderate steepness, soil wetness in winter and spring, and physical soil characteristics, such as the presence of plastic clay. The rating was *severe* if special equipment was needed and its use was seriously limited by moderate steepness, soil wetness in winter and spring, and physical soil characteristics, such as the presence of plastic clay, and by safety in operations.

Seedling mortality, or regeneration potential, refers to the failure of tree seedlings to survive and grow that is caused mainly by soil or topographic conditions. It is assumed that plant competition and rainfall are not limiting factors. The term "seedlings" applies to naturally occurring seedlings, direct-seeded seedlings, and planted seedlings. In each of these three methods of regeneration, it is assumed that the seedlings initially established are of species well suited to the soil and total site. In the case of naturally occurring seedlings, it is assumed there is an adequate source of seed, acceptable rates of seed germination, and favorable sites. In the case of direct-seeded seedlings, it is assumed that there are acceptable rates of seed germination, proper treatment of seed with bird and rodent repellents, adequate rates of seeding, and favorable seedbeds. For planted seedlings it is assumed that the quality of planting stock is good; that packing, handling, heeling in, or storing of seedlings is properly done; that planting sites are favorable; and that planting techniques are correct and done with reasonable care.

Seedling mortality is rated *slight* if not more than 25 percent of the seedlings that are initially established die within the first growing season. Natural seedling, direct seeding, and tree plantings are ways in which the seedlings can be established. An adequately stocked stand consists of 700 to 1,000 seedlings per acre. Normally, there is no special problem in obtaining an adequately stocked stand if the mortality rating is slight.

A rating of *moderate* indicates that losses of 25 to 50 percent of the seedlings established can be expected. Generally some interplanting will be needed to reinforce the initial planting and bring about adequate restocking. Direct-seeding in spots or in small areas may also be done to obtain fully or adequately stocked stands where initial direct-seeding failed or natural seeding was not satisfactory.

A rating of *severe* indicates that seedling losses of more than 50 percent can be expected. Such losses may occur on unfavorable sites, especially where the soils are excessively wet. In such places, replanting or a second attempt at direct-seeding may be needed to obtain adequate stocking. Special site preparation, such as "bedding," may also be tried.

The preferred species are those to be favored in existing stands or those to be favored in establishing a stand by planting, direct seeding, or natural seeding. No attempt was made to list all species that grow. The trees were selected on the basis of adaptability,

growth, quality, value, and marketability of the products obtained from each.

Use of the Soils for Wildlife [5]

All wildlife is directly or indirectly dependent upon plant life and thus is related to soil through the ability of soil to produce the necessary plant life. Each kind of wildlife needs a certain kind of habitat, which is determined largely by the characteristics of the soil, the use of the land, and the pattern of vegetation. Some kinds of wildlife are adapted only to woodland, some only to marshland, and others only to open farmland; but most need a combination of these. Because different soils produce different plant associations, it is necessary to know the soils of an area if better wildlife habitat is to be produced. The information in this section is intended as a guide in planning wildlife habitat. The nearest office of the Soil Conservation Service can provide additional help in planning a program that fits the soil and land use patterns on a specific farm.

All the soils in Montgomery County produce plant associations suitable for some kind of native wildlife, but some support one kind or group of wildlife better than the others. For each of the soils in the county, table 4 gives ratings of suitability for the elements of wildlife habitat and for three kinds of wildlife. These ratings refer only to the suitability of the soil and do not take into account the climate, the present use of the soil, or the population distribution of other wildlife or of man. Onsite inspection is needed to determine the suitability of a specific site.

The ratings given in table 4 are defined as follows:

Well suited means that habitats generally are easily created, improved, or maintained; that the soil has few or no limitations that affect management; and that satisfactory results can be expected.

Suited means that habitats can be created, improved, or maintained in most places; that the soil has moderate limitations that affect management; and that a moderate intensity of management and fairly frequent attention may be required for satisfactory results.

Poorly suited indicates that habitats can be created, improved, or maintained in most places; that the soil has rather severe limitations; that habitat management is difficult and expensive and requires intensive effort; and the results are not always satisfactory.

Unsuited indicates that it is impractical or impossible to create, improve, or maintain habitats and that unsatisfactory results are probable.

Following are explanations of the elements of wildlife habitat shown in table 4.

Grain and seed crops are mainly farm crops that provide food for wildlife. The rating reflects the suitability of the soil, under good management, to produce crops. Examples of these crops are corn, dove proso millet, browntop millet, wheat, and oats.

Grasses and legumes are plants that furnish food and cover for wildlife. The rating reflects the suitability of the soil for various grasses and legumes. Examples of these crops are fescue, clover, shrub lespedeza, annual lespedeza, soybeans, ryegrass, lovegrass, and kudzu.

Wild herbaceous plants are native or introduced perennial plants that furnish food and cover to wildlife. The rating reflects the suitability of the soil for these plants under natural conditions and little or no management. Examples of these plants are pokewood, tickclover, ragweed, and doveweed.

Hardwood trees and shrubs produce fruit, buds, nuts, and foliage that are used by wildlife for food and cover. Management is not reflected in the rating, but it may be needed and applied. Examples of these trees and shrubs are oaks, hickory, grapes, autumn-olive, pyracantha, dogwood, poplar, and multiflora rose.

Wetland food and cover plants are wild herbaceous plants and trees that are mainly associated with wetland areas. This rating reflects the suitability of the soil for these plants under natural conditions. Examples of these plants are rushes, sedges, smartweed, cattails, water tupelo-gum, swamp tupelo-gum, cypress, and Carolina ash.

Shallow water developments refer to the development of shallow ponds or flooded areas. They are listed because of their important relationship to many kinds of wildlife. In most places, a great deal of management is required to create or improve this habitat component.

Following are explanations of the kinds of wildlife shown in table 4.

Openland wildlife are birds and mammals that are generally associated with the edges or open areas. Examples are mourning doves, quail, foxes, cottontail rabbits, and many kinds of songbirds. Openland areas are also important to woodland wildlife, and this interrelationship must be considered when planning a management program of any type.

Woodland wildlife are found mainly in woodland areas. Examples are deer, bear, swamp rabbits, bobcats, and squirrels.

Wetland wildlife are birds and mammals that inhabit mainly wetland areas, such as swamps, marshes, or ponds. Examples are muskrat, mink, raccoon, redwing blackbird, and ducks.

Engineering Uses of the Soils [6]

This section is useful to those who need information about soils used as structural material or as foundation upon which structures are built. Among those who benefit from this section are planning commissions, town and city managers, land developers, engineers, contractors, and farmers.

Among properties of soils highly important in engineering are permeability, strength, compaction characteristics, soil drainage condition, shrink-swell potential, grain size, plasticity, and soil reaction. Also important are depth to the water table, depth to bedrock, and slope. These properties, in various degrees

[5] EDWARD G. SULLIVAN, biologist, Soil Conservation Service, helped prepare this section.

[6] JOHN W. MCCURDY, agricultural engineer, Soil Conservation Service, helped prepare this section.

and combinations, affect construction and maintenance of roads, airports, pipelines, foundations for small buildings, irrigations systems, ponds and small dams (fig. 7), and systems for disposal of sewage and refuse.

Information in this section can be helpful to those who—

1. Select potential residential, industrial, commercial, and recreational areas.
2. Evaluate alternate routes for roads, highways, pipelines, and underground cables.
3. Seek sources of gravel, sand, or clay.
4. Plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for controlling water and conserving soil.
5. Correlate performance of structures already built with properties of the kinds of soil on which they are built, for the purpose of predicting performance of structures on the same or similar kinds of soil in other locations.
6. Predict the trafficability of soils for cross-country movement of vehicles and construction equipment.
7. Develop preliminary estimates pertinent to construction in a particular area.

Most of the information in this section is presented in tables 5 and 6. Table 5 shows several estimated soil properties significant to engineering, and table 6 gives interpretations for various engineering uses.

This information, along with the soil map and other parts of this publication, can be used to make interpretations in addition to those given in tables 5 and 6, and it also can be used to make other useful maps.

This information, however, does not eliminate the need for further investigations at sites selected for engineering works, especially works that involve heavy loads or that require excavations to depths greater than those shown in the tables, generally depths greater than 6 feet. Also, inspection of sites, especially the small ones, is needed because many delineated areas of a given soil mapping unit may contain small areas of other kinds of soil that have strongly contrasting properties and different suitabilities or limitations for soil engineering.

Some of the terms used in this soil survey have special meaning to soil scientists. The Glossary defines many of the terms commonly used in soil science.

Engineering classification systems

The two systems most commonly used in classifying samples of soils for engineering are the Unified system used by the SCS engineers, Department of Defense, and others, and the AASHO system adopted by the American Association of State Highway Officials.

TABLE 4.—*Suitability of soils for*

Soil series and map symbols	Elements of wildlife habitat			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees and shrubs
Ariel: Ar	Suited	Suited	Suited	Well suited
Arkabutla: At	Suited	Suited	Suited	Well suited
Brewton: Br	Suited	Suited	Suited	Well suited
Bruno: Bu	Suited	Suited	Suited	Suited
Calloway: Ca	Suited	Suited	Suited	Suited
Cascilla: Cc	Well suited	Well suited	Well suited	Well suited
Chenneby: Ch	Poorly suited	Suited	Suited	Well suited
Mapped only in an association with Arkabutla soils; for Arkabutla part of Ch, see Arkabutla series.				
Collins: Cm	Suited	Well suited	Well suited	Well suited
Gillsburg: Gb	Suited	Suited	Well suited	Well suited
Grenada: GrA, GrB2	Suited	Well suited	Well suited	Well suited
Gullied land: GuF.				
Gullied land is too variable to be rated; for Providence part of GuF, see Providence series.				
Guyton: Gy	Poorly suited	Suited	Suited	Well suited
Iuka: Iu	Suited	Well suited	Well suited	Well suited
Loring: LoB2, LoC2	Suited	Well suited	Well suited	Well suited
Mashulaville: Ma	Poorly suited	Suited	Suited	Well suited
Providence: PrB2, PrC, PrC3, PrD2, PrD3	Suited	Well suited	Well suited	Well suited
Smithdale: SpE, SrE3, SsE	Poorly suited	Suited	Well suited	Suited
For Providence part of SpE, SrE3, and SsE, see Providence series; for Sweatman part of SsE, see Sweatman series.				
Sweatman: StF3	Poorly suited	Poorly suited	Well suited	Poorly suited
For Smithdale part of StF3, see Smithdale series.				
Tippah: TsD2	Suited	Well suited	Well suited	Well suited
Mapped only in a complex with Sweatman soils; for Sweatman part of TsD2, see Sweatman series.				

In the Unified system soils are classified according to particle-size distribution, plasticity, liquid limit, and organic matter (*13*). Soils are grouped in 15 classes. There are eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes are designated by symbols for both classes; for example, CL-ML.

The AASHO system is used to classify soils according to those properties that affect use in highway construction and maintenance (*1*). In this system, a soil is placed in one of seven basic groups, ranging from A–1 through A–7, on the basis of grain-size distribution, liquid limit, and plasticity index. In group A–1 are gravelly soils of high bearing strength, or the best soils for subgrade (foundation). At the other extreme, in group A–7, are clay soils that have low strength when wet and that are the poorest soils for subgrade. Where laboratory data are available to justify a further breakdown, the A–1, A–2, and A–7 groups are divided as follows: A–1–a, A–1–b, A–2–4, A–2–5, A–2–6, A–2–7, A–7–5, and A–7–6. An additional refinement, the engineering value of a soil material, can be indicated by a group index number. Group indexes range from 0 for the best material to 20 or more for the poorest. The estimated AASHO classification, without group index numbers, is given in table 5 for all soils mapped in the survey area.

Soil properties significant in engineering

Several estimated soil properties significant in engineering are given in table 5. These estimates are made for typical soil profiles, by layers sufficiently different to have different significance for soil engineering. The estimates are based on field observations made in the course of mapping, on test data for these and similar soils, and on experience with the same kinds of soil in other counties. Following are explanations of some of the columns in table 5.

Depth to seasonal high water table is the distance from the surface of the soil to the highest level that ground water reaches in the soil in most years.

Depth from surface shows the depth to and the thickness of the layers for which estimates were made.

Soil texture is described in table 5 in the standard terms used by the Department of Agriculture. These terms take into account relative percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the soil contains gravel or other particles coarser than sand, an appropriate modifier is added, as for example, "gravelly loamy sand." "Sand," "silt," "clay," and

wildlife habitat and kinds of wildlife

Elements of wildlife habitat—Continued		Kinds of wildlife		
Wetland food and cover plants	Shallow water developments	Openland	Woodland	Wetland
Poorly suited	Poorly suited	Suited	Well suited	Poorly suited.
Suited	Suited	Suited	Well suited	Suited.
Suited	Suited	Suited	Well suited	Suited.
Unsuited	Unsuited	Suited	Suited	Unsuited.
Suited	Suited	Suited	Suited	Suited.
Poorly suited	Poorly suited	Well suited	Well suited	Poorly suited.
Suited	Suited	Poorly suited	Suited	Suited.
Poorly suited	Poorly suited	Suited	Well suited	Poorly suited.
Suited	Suited	Suited	Well suited	Suited.
Poorly suited	Poorly suited	Well suited	Well suited	Poorly suited.
Suited	Suited	Poorly suited	Well suited	Suited.
Poorly suited	Poorly suited	Suited	Well suited	Poorly suited.
Poorly suited	Poorly suited	Well suited	Well suited	Poorly suited.
Well suited	Well suited	Poorly suited	Well suited	Well suited.
Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Unsuited	Suited	Suited	Unsuited.
Unsuited	Unsuited	Poorly suited	Poorly suited	Unsuited.
Unsuited	Unsuited	Well suited	Well suited	Unsuited.

Figure 7.—**In background is small dam that controls flooding downstream. The pond is also used for fishing. In foreground are pine trees and sericea lespedeza that help to stabilize the borrow area.**

some of the other terms used in USDA textural classification are defined in the Glossary.

Permeability is that quality of a soil that enables it to transmit water or air. It is estimated on the basis of those soil characteristics observed in the field, particularly structure and texture. The estimates in table 5 do not take into account lateral seepage or such transient soil features as plowpans and surface crusts. Layers of soil that impede drainage or are very permeable can greatly affect the suitability of the soil material for foundations, sewage disposal fields, highways and highway subgrades, railroad embankments, fills, and irrigation systems.

Available water capacity is the ability of soils to hold water for use by most plants. It is commonly defined as the difference between the amount of water in the soil at field capacity and the amount at the wilting point of most plants. When the soil is air dry, this amount of water wets the soil material to a depth of 1 inch without deeper percolation.

Reaction is the degree of acidity or alkalinity of a soil, expressed in pH. The pH value and terms used to describe soil reaction are explained in the Glossary.

Shrink-swell potential is the relative change in volume to be expected of soil material with changes in moisture content, that is, the extent to which the soil shrinks as it dries out or swells when it gets wet. Extent of shrinking and swelling is influenced by the amount and kind of clay in the soil. Shrinking and swelling of soils causes much damage to building foundations, roads, and other structures. A *high* shrink-swell potential indicates a hazard to maintenance of structures built in, on, or with material having this rating. This rating is based on tests for volume change that were made on similar soils in adjacent counties, or it is based on observations of other prop-

erties of the soils. In general, soils classified as CH and A-7 have high shrink-swell potential. Clean sand and gravel that contain small amounts of nonplastic to slightly plastic fines have low shrink-swell potential.

Engineering interpretations of soils

The estimated interpretations in table 6 are based on the engineering properties of soils shown in table 5, on test data for soils in this survey area and others nearby or adjoining, and on the experience of engineers and soil scientists with the soils of Montgomery County. The depth to which these data apply is not more than 6 feet. In table 6, ratings are used to summarize limitation or suitability of the soils for all listed purposes other than for drainage of cropland and pasture, reservoirs and embankments, irrigation, terraces and diversions, and waterways. For these particular uses, table 6 lists those soil features not to be overlooked in planning, installation, and maintenance. Detrimental or undesirable features are emphasized, but important desirable features also are listed.

Following are explanations of the column heads in table 6.

Topsoil is used for topdressing an area where vegetation is to be established and maintained. Suitability is affected mainly by ease of working and spreading the soil material, as for preparing a seedbed; natural fertility of the material, or response of plants when fertilizer is applied; and absence of substances toxic to plants. Texture of the soil material and its content of stone fragments are characteristics that affect suitability, but also considered in the ratings is damage that results at the area from which topsoil is taken.

Road fill is soil material used in embankments for roads. The suitability ratings reflect (1) the predicted performance of soil after it has been placed in an embankment that has been properly compacted and provided with adequate drainage and (2) the relative ease of excavating the material at borrow areas. In general, sandy material that contains adequate binder is better than other materials. Organic materials and plastic clay that have high shrink-swell potential are poorest. In this county, Bruno and Smithdale soils are better sources of road fill than other soils.

Highway location is affected mainly by ponding, flooding, a seasonal high water table, and other hazards that affect the construction and maintenance of highways. The entire profile of undisturbed soil is considered. On soils that are ponded, roads have to be constructed on high embankment sections or have to be provided with surface and subsurface drainage. On soils that are flooded, such as those of the Arkabutla and Chenneby series, roads must be constructed on continuous embankments several feet above the general level of floodwater.

Reservoir areas hold water behind a dam or embankment. Soils suitable for pond reservoir areas have low seepage. This seepage is related to permeability and depth to fractured or permeable bedrock or other permeable material.

Embankments require soil material resistant to seepage and piping and of favorable stability, shrink-swell potential, shear strength, and compactibility. Presence of stones or organic material in a soil are among factors that are unfavorable.

Drainage of cropland and pasture is affected by such soil properties as permeability, texture, and structure; depth to claypan, rock, or other layers that influence rate of water movement; depth to the water table; slope; stability in ditchbanks; susceptibility to stream overflow; salinity or alkalinity; and availability of outlets for drainge. If used for crops, most of the nearly level soils in the county need drainage.

Irrigation of a soil is affected by such features as slope; susceptibility to stream overflow, water erosion, or soil blowing; soil texture; content of stones; accumulations of salts, and alkali; depth of root zone; rate of water intake at the surface; permeability of soil layers below the surface layer and in the fragipan or other layers that restrict movement of water; amount of water held available to plants; and need for drainage or depth to water table or bedrock.

Terraces and diversions are embankments, or ridges, constructed across the slope to intercept runoff so that it soaks into the soil or flows slowly to a prepared outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock or other unfavorable material; presence of stones; permeability; and resistance to water erosion, soil slipping, and soil blowing. A soil suitable for these structures provides outlets for runoff and is not difficult to vegetate.

Waterways are used for drainge and control of erosion. They generally are needed for soils on flood plains and for nearly level soils on uplands. The erodibility of the soils affects shaping, seeding, and establishment of waterways. A seasonal high water table limits the use of equipment.

Town and Country Planning [7]

Montgomery County has an unusual potential for increased recreational development because of its location, accessibility, and natural resources. Much of it is easily accessible by highways. Among the county's natural resources conducive to recreational developments are many lakes and reservoirs, many large tracts of pine and hardwood timber, abundant fish and game, and a sparse rural population.

There has been considerable development of residential subdivisions, vacation cottages, hunting and fishing areas, and a variety of recreational facilities for water-based and land-based recreation activities.

Knowledge of soils is necessary in planning, developing, and maintaining town and country areas. In table 7 the soils of Montgomery County are rated according to limitations that affect their suitability for camp sites, picnic areas, playgrounds, and paths and trails, as well as for building sites for dwellings and sewage disposal.

In table 7 the soils are rated as having slight, moderate, or severe limitations for specified uses. For all of these ratings, it is assumed that a good cover of vegetation can be established and maintained. A limi-

[7] GEORGE W. YEATES, soil conservationist, Soil Conservation Service, helped prepare this section.

TABLE 5.—*Estimated soil properties*

[An asterisk in the first column indicates that at least one mapping unit is made up of two or more kinds of soil. The soils in such mapping series that appear in the first column of this table. The

Soil series and map symbols	Depth of seasonal high water table	Depth from surface	USDA texture	Classification	
				Unified	AASHO
	Inches	*Inches*			
Ariel: Ar	24	0–30	Silt loam	ML	A–4
		30–65	Silt loam	ML or CL	A–4 or A–6
Arkabutla: At	15	0–5	Silt loam	ML	A–4
		5–44	Silt loam	ML or CL	A–6 or A–4
		44–60	Silty clay	CL	A–6
Brewton: Br	[1] 16	0–5	Fine sandy loam	SM	A–4
		5–25	Loam	ML	A–4
		25–60	Loam	ML	A–4
Bruno: Bu	48	0–6	Silt loam	ML	A–4
		6–60	Fine sand and silt loam	SM or ML	A–2 or A–4
Calloway: Ca	[1] 15	0–22	Silt loam	ML or CL–ML	A–4
		22–60	Silt loam	ML or CL	A–4 or A–6
Cascilla: Cc	48	0–50	Silt loam	ML or CL–ML	A–4
		50–62	Loam	ML	A–4
*Chenneby: Ch. Mapped only in an association with Arkabutla soils; for Arkabutla part of this unit, see Arkabutla series.	15	0–8	Silt loam	ML	A–4
		8–65	Silt loam	ML or CL	A–6 or A–4
Collins: Cm	24	0–50	Silt loam	ML	A–4
Gillsburg: Gb	12	0–20	Silt loam	ML or CL–ML	A–4
		20–65	Silt loam	ML or CL	A–4 or A–6
Grenada: GrA, GrB2	[1] 24	0–30	Silt loam	ML or CL–ML	A–4
		30–60	Silt loam	ML or CL	A–4 or A–6
*Gullied land: GuF. Properties of Gullied land are too variable to be estimated. For Providence part of this unit, see Providence series.					
Guyton: Gy	([1])	0–23	Silt loam	ML	A–4
		23–60	Silt loam	CL	A–6
Iuka: Iu	24	0–5	Fine sandy loam	SM	A–4
		5–25	Sandy loam	SM	A–4
		25–48	Silt loam	ML	A–4
Loring: LoB2, LoC2	[1] 24	0–5	Silt loam	ML	A–4
		5–27	Silty clay loam and silt loam	CL	A–6
		27–60	Silt loam	ML or CL	A–4 or A–6
Mashulaville: Ma	([1])	0–8	Fine sandy loam	SM	A–4
		8–22	Loam	ML	A–4
		22–50	Loam	ML	A–4
Providence: PrB2, PrC, PrC3, PrD2, PrD3	[1] 24	0–4	Silt loam	ML	A–4
		4–29	Silty clay loam and silt loam	CL	A–6
		29–42	Silt loam	CL or ML	A–6 or A–4
		42–57	Loam	ML	A–6
		57–65	Sandy loam	SM	A–4
*Smithdale: SpE, SrE3, SsE. For Providence part of SpE, SrE3, and SsE, see Providence series; for Sweatman part of SsE, see Sweatman series.	>48	0–11	Sandy loam	SM	A–4
		11–38	Sandy clay loam	SC or CL	A–6
		38–80	Sandy loam	SM	A–4

See footnotes at end of table.

significant in engineering

units may have different properties and limitations, and for this reason it is necessary to follow carefully the instructions for referring to other symbol > means greater than; the symbol < means less than]

Percentage passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)				
				Inches per hour	*Inches per inch of soil*	*pH*	
100	100	100	90–100	0.63–2.0	0.20–0.22	4.5–5.5	Low.
100	100	100	90–100	0.20–0.63	0.16–0.20	4.5–5.5	Low.
100	100	95–100	95–100	0.63–2.0	0.20–0.23	4.5–5.5	Low.
100	100	95–100	95–100	0.63–2.0	0.19–0.22	4.5–5.5	Moderate to low.
100	100	95–100	95–100	0.63–2.0	0.18–0.21	4.5–5.5	Moderate.
100	95–100	70–85	36–50	0.63–2.0	0.12–0.15	4.5–5.5	Low.
100	95–100	70–85	60–75	0.63–2.0	0.12–0.15	4.5–5.5	Low.
100	95–100	70–85	60–75	0.06–0.20	0.08–0.12	4.5–5.5	Low.
100	100	85–100	80–95	0.63–2.0	0.20–0.24	5.1–7.3	Low.
100	100	85–100	30–60	2.0–6.3	0.05–0.10	5.1–7.3	Low.
100	100	100	90–100	0.63–2.0	0.20–0.23	5.1–6.0	Low.
100	100	100	90–95	0.06–0.2	0.07–0.11	5.1–6.0	Low to moderate.
100	100	100	90–100	0.63–2.0	0.20–0.23	4.5–5.5	Low.
100	100	80–100	60–80	0.63–2.0	0.12–0.15	4.5–5.5	Low.
100	100	95–100	85–95	0.63–2.0	0.15–0.20	4.5–5.5	Low.
100	100	95–100	85–95	0.63–2.0	0.15–0.20	4.5–5.5	Low.
100	100	100	90–100	0.63–2.0	0.20–0.23	4.5–5.5	Low.
100	100	100	90–100	0.63–2.0	0.20–0.22	4.5–5.5	Low.
100	100	90–100	80–95	0.2–0.63	0.16–0.20	4.5–5.5	Low.
100	100	100	90–100	0.63–2.0	0.20–0.23	4.5–6.0	Low.
100	100	100	90–100	0.06–0.2	0.14–0.17	4.5–6.0	Low to moderate.
100	100	95–100	75–90	0.2–0.63	0.21–0.23	4.5–6.5	Low.
100	100	95–100	75–90	<0.06	0.20–0.22	4.5–6.5	Moderate.
100	100	70–90	40–50	0.63–2.0	0.12 0.16	4.5–5.5	Low
100	100	65–85	36–45	0.63–2.0	0.10–0.14	4.5–5.5	Low.
100	100	75–95	60–75	0.63–2.0	0.19–0.23	4.5–5.5	Low.
100	100	100	95–100	0.63–2.0	0.20–0.23	4.5–6.0	Low.
100	100	100	95–100	0.63 -2.0	0.20 0.22	4.5–6.0	Moderate.
100	100	100	95–100	0.20–0.63	0.08–0.17	4.5–6.0	Low.
100	100	85–95	40–50	0.63–2.0	0.10–0.14	4.5–5.5	Low.
100	100	85–95	50–60	0.2–0.63	0.11–0.14	4.5–5.5	Low.
100	100	85–95	50–60	0.06–0.20	0.10–0.12	4.5–5.5	Low.
100	100	100	85–100	0.63–2.0	0.20–0.22	4.5–5.5	Low.
100	100	100	85–100	0.63–2.0	0.20–0.22	4.5–5.5	Moderate.
100	100	90–100	70–90	0.20–0.63	0.10–0.15	4.5–5.5	Low.
100	95–100	85–95	60–80	0.20–0.63	0.10–0.15	4.4–5.5	Low.
100	90–100	60–70	36–50	0.63–2.0	0.10–0.15	4.5–5.5	Low.
100	100	70–95	36–45	2.0–6.3	0.10–0.14	4.5–5.5	Low.
100	100	80–90	40–55	0.63–2.0	0.12–0.16	4.5–5.5	Low.
100	100	70–95	36–50	2.0–6.3	0.10–0.14	4.5–5.5	Low.

TABLE 5.—*Estimated soil properties*

Soil series and map symbols	Depth of seasonal high water table	Depth from surface	USDA texture	Classification	
				Unified	AASHO
	Inches	*Inches*			
*Sweatman: StF3	>48	0–2	Silt loam	ML	A–4
For Smithdale part of this unit, see Smithdale series.		2–14	Silty clay	CL	A–6
		14–44	Clay and silty clay	CH or MH	A–7
		44–60	Shale.[2]		
*Tippah: TsD2	[1] 24	0–3	Silt loam	ML	A–4
Mapped only in a complex with Sweatman soils; for Sweatman part of TsD2, see Sweatman series.		3–22	Silty clay loam	CL	A–6
		22–60	Clay	CH	A–7

[1] Perched water table.

tation of *slight* means that soil properties are generally favorable and that limitations are so minor that they easily can be overcome. A *moderate* limitation can be overcome or modified by planning, by design, or by special maintenance. A *severe* limitation means that costly soil reclamation, special design, intense maintenance, or a combination of these, is required.

Following are explanations of the columns in table 7. Building sites for dwellings are for dwellings that are not more than three stories high and that are supported by foundation footings placed in undisturbed soil. The soil features that affect the degree of limitation for dwellings are those that relate to capacity to support load and to resist settlement under load and those that relate to ease of excavation. Soil properties that affect capacity to support load are wetness, susceptibility to flooding, density, plasticity, texture, and shrink-swell potential. Those that affect excavation are wetness, slope, depth to bedrock, and content of stones and rocks. The kind of system used for sewage disposal has not been considered.

Sewage lagoons are shallow ponds constructed to hold sewage within a depth of 2 to 5 feet long enough for bacteria to decompose the solids. A lagoon has a nearly level floor and sides, or embankments, of compacted soil material. It is assumed that the embankment is compacted to medium density and that the pond is protected from flooding. Properties considered are those that affect the pond floor and the embankment. Those that affect the pond floor are permeability, organic-matter content, and slope. If the floor needs to be leveled, depth to bedrock is important. The soil properties that affect the embankment are the engineering properties of the embankment material as interpreted from the Unified Soil Classification and the amounts of stones, if any, that affect ease of excavation and compaction of the embankment material.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into natural soil. The soil material from a depth of 18 to 72 inches is evaluated. The soil properties considered are those that affect both absorption of effluent and construction and operation of the system. Properties that affect absorption are permeability, depth to water table or rock, and susceptibility to flooding. Slope is a soil property that affects difficulty of layout and construction and the risk of soil erosion, lateral seepage, and downslope flow of effluent. Large rocks or boulders increase construction costs.

Campsites are used intensively for tents and small camp trailers and the accompanying activities of outdoor living. Little preparation of the site is required, other than shaping and leveling for tent and parking areas. Camp areas are subject to heavy foot traffic and vehicular traffic during the period May through September. The best soils have mild slopes, good drainage, a surface free of rocks and coarse fragments, freedom from flooding during periods of heavy use, and a surface that is firm after rains but not dusty when dry.

Picnic areas are attractive natural or landscaped tracts used mainly for preparing meals and eating outdoors. These areas are subject to heavy foot traffic. Most of the vehicular traffic, however, is confined to access roads. The better soils are firm when wet, but not dusty when dry; are free of flooding during the season of use; and do not have slope or stoniness that greatly increases cost of leveling the site or of building the access roads.

Playgrounds are areas used intensively for baseball, football, badminton, and similar organized games. Soils suitable for this use need to withstand intensive foot traffic. The better soils are nearly level; are free of coarse fragments and rock outcrops; have good drainage; are free from flooding during periods of heavy use; and have a surface that is firm after rains, but not dusty when dry. If grading and leveling are required, depth to rock is important.

Paths and trails are used for local and cross-country travel by foot, bicycle, or horseback. Design and layout should require little or no cutting and filling. The better soils are at least moderately well drained; are firm when wet, but not dusty when dry; are flooded not more than once during the season of use; and have slopes of less than 15 percent. Few or no rocks or stones are on the surface.

significant in engineering—Continued

Percentage passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)				
				Inches per hour	*Inches per inch of soil*	*pH*	
100	100	90–100	70–90	0.20–0.63	0.20–0.22	4.5–5.5	Low.
100	100	95–100	70–85	0.20–0.63	0.20–0.22	4.5–5.5	Moderate.
100	100	95–100	75–95	0.20–0.63	0.15–0.17	4.0–5.0	High.
100	100	95–100	95–100	0.63–2.0	0.20–0.22	4.5–6.0	Low.
100	100	95–100	85–95	0.06–0.20	0.19–0.21	4.5–6.0	Moderate.
100	100	95–100	85–95	>0.06	0.16–0.18	4.5–6.0	High.

[2] Too variable for reliable estimates.

Formation and Classification of the Soils

This section discusses the factors of soil formation and their effect on the formation of soils in Montgomery County. It explains the processes that cause the differentiation of soil horizons and discusses the current system of soil classification used in the United States. Table 8 shows the classification of soils by some of the higher categories in the current system.

Factors of Soil Formation

Soil is the product of the interaction of the five major factors of soil formation. These factors are parent material, climate, living organisms (especially vegetation), relief, and time. All five of these factors take part in the formation of every soil, but the influence of each varies from one place to another. If a factor, such as parent material or living organisms, is different, the soil that forms is different.

Parent material

Parent material is the unconsolidated mass from which soils form. It has much to do with the chemical and mineralogical composition of the soils. The parent materials of the soils in Montgomery County are loess, Coastal Plain sediments of marine origin, and alluvium.

It is believed that the loess is largely glacial rock flour that was carried southward and deposited on flood plains by streams that formed from melting ice and later redeposited by wind on the older Coastal Plain Formations.

In Montgomery County, geologic erosion has removed most of the loess from the steeper areas. The loess is now mainly in the less sloping areas and in stream valleys, but some remains as thin caps on ridgetops in the steeper areas. Unweathered loess is mainly silt and has uniform physical and chemical composition, but the particles are irregularly shaped. Grenada soils formed in this kind of material.

Some of the soils in Montgomery County formed in areas where the overlying layer of loess is thin. In these areas the horizons in the upper part of the soil formed in weathered loess, and those in the lower part formed in Coastal Plain materials. Providence soils formed in these kinds of parent materials.

In the steeper areas the parent materials are dominantly Coastal Plain sediments of marine origin. These sediments are a mixture of sand, silt, and clay particles. Smithdale soils formed in this kind of parent material.

Some of the soils in the county formed in alluvium that was washed from the surrounding uplands and was deposited on the flood plains by the streams. The particles of alluvium are dominantly silt, but they are mixed with some sand and clay. Collins soils formed in this kind of parent material.

Climate

Climate affects the physical, chemical, and biological relationships in the soil, mainly through the influence of precipitation and temperature. In Montgomery County it is warm and moist and probably similar to the climate when the soils were forming. This kind of climate has promoted rapid soil development. Climate is uniform throughout the county, but its effect is modified locally by relief and runoff.

The warm temperature influences the kinds and growth of organisms and affects the amount of time needed for physical and chemical reactions to take place in the soils. Water from the relatively high rainfall leaches bases and other soluble material and carries colloidal matter and other less soluble material downward.

Living organisms

Micro-organisms, plants, earthworms, and all other organisms that live on and in the soil have an important effect on its formation. Bacteria, fungi, and other micro-organisms aid in weathering rock and in decomposing organic matter. Large plants alter the soil climate in small areas (soil micro-climate). They also supply organic matter to the soil and transfer elements from the subsoil to the surface soil. The kinds

TABLE 6.—*Engineering*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The soils in such to other series that appear in

Soil series and map symbols	Suitability as source of—		Soil features affecting—	
	Topsoil	Road fill	Highway location	Farm ponds, reservoir area
Ariel: Ar	Good	Fair: fair traffic-supporting capacity.	Subject to flooding	Moderately slow permeability.
Arkabutla: At	Fair: wetness	Fair: wetness	Subject to flooding	Moderate permeability.
Brewton: Br	Fair: wetness	Fair: wetness	Wetness	Slow permeability
Bruno: Bu	Poor: sandy texture.	Good	Subject to flooding	Moderately rapid permeability.
Calloway: Ca	Fair: wetness	Fair: wetness; fair traffic-supporting capacity.	Wetness	Slow permeability
Cascilla: Cc	Good	Fair: fair traffic-supporting capacity.	Fair traffic-supporting capacity; subject to flooding.	Moderate permeability.
*Chenneby: Ch Mapped only in an association with Arkabutla soils; for Arkabutla part of this unit, see Arkabutla series.	Fair: wetness	Fair: fair traffic-supporting capacity.	Frequently flooded	Moderate permeability.
Collins: Cm	Good	Fair: fair traffic-supporting capacity.	Subject to flooding	Moderate permeability.
Gillsburg: Gb	Fair: wetness	Fair: fair traffic-supporting capacity.	Subject to flooding	Moderately slow permeability.
Grenada: GrA, GrB2	Fair: wetness	Fair: fair traffic-supporting capacity.	Wetness	Slow permeability
*Gullied land: GuF. For Gullied land, no interpretations made. Properties are too variable. For Providence part of this unit, see Providence series.				
Guyton: Gy	Poor: wetness	Poor: wetness	Subject to flooding; wetness.	Very slow permeabillty.
Iuka: Iu	Fair: wetness	Fair: wetness	Subject to flooding	Moderate permeability.
Loring: LoB2, LoC2	Fair: silty clay loam below depth of 5 inches.	Fair: fair traffic-supporting capacity.	Gently sloping to sloping.	Moderately slow permeability.
Mashulaville: Ma	Poor: wetness	Poor: wetness	Subject to flooding; wetness.	Slow permeability
Providence: PrB2, PrC, PrC3, PrD2, PrD3	Fair: silty clay loam below depth of 4 inches.	Fair: fair traffic-supporting capacity.	Gently sloping to sloping.	Permeable material at depth of 4 to 6 feet in places.

interpretations of the soils

mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the instructions for referring the first column of this table]

Soil features affecting—Continued				
Farm ponds, embankment	Drainage of cropland and pasture	Irrigation	Terraces and diversions	Waterways
Fair stability	Nearly level; well drained.	Moderately slow permeability.	Nearly level	Very high available water capacity; grows good sod.
Fair stability	Nearly level; somewhat poorly drained.	Moderate permeability	Nearly level	Very high available water capacity; grows good sod.
Fair stability	Nearly level; somewhat poorly drained.	Slow permeability	Nearly level	Medium available water capacity; grows fair sod.
Fair stability	Nearly level; excessively drained.	Moderately rapid permeability.	Nearly level	Low available water capacity; stands difficult to establish.
Fair stability	Nearly level; somewhat poorly drained.	Slow permeability	Nearly level	Medium available water capacity; grows good sod.
Fair stability	Nearly level; well drained.	Moderate permeability	Nearly level	Very high available water capacity; grows good sod.
Moderate strength; fair stability.	Water ponds; needs surface drainage.	Moderate permeability	Nearly level	High available water capacity; grows good sod.
Fair stability	Water ponds; needs surface drainage.	Moderate permeability	Nearly level; needs diversions in some fields.	Very high available water capacity; grows good sod.
Fair stability	Water ponds; needs surface drainage.	Moderately slow permeability.	Nearly level; needs diversions in some fields.	High available water capacity; grows good sod.
Fair stability	Nearly level; needs surface drainage.	Slow permeability	Nearly level and gently sloping; soil features favorable.	Medium available water capacity; grows good sod.
Fair stabillty	Nearly level; wetness; poorly drained; needs surface drainage.	Very slow permeability	Nearly level	Very high available water capacity; grows good sod.
Fair stability	Nearly level; needs surface drainage.	Moderate permeability	Nearly level	High available water capacity; grows good sod.
Fair stability	Gently sloping and sloping; moderately well drained.	Moderately slow permeability.	Soil properties favorable; needs terraces in cultivated fields.	Medium to high available water capacity; grows good sod.
Fair stability	Nearly level; poorly drained.	Slow permeability	Nearly level	Low available water capacity; grows fair sod.
Fair stability	Gently sloping to sloping; moderately well drained.	Moderately slow permeability.	Soil properties favorable	Medium to high available water capacity; grows good sod.

TABLE 6.—*Engineering interpretations*

Soil series and map symbols	Suitability as source of—		Soil features affecting—	
	Topsoil	Road fill	Highway location	Farm ponds, reservoir area
*Smithdale: SpE, SrE3, SsE For Providence part of SpE, SrE3, and SsE, see Providence series; for Sweatman part of SsE, see Sweatman series.	Fair: sandy clay loam at depth of 11 inches.	Good	Sloping to steep	Moderate permeability.
*Sweatman: StF3 For Smithdale part of this unit, see Smithdale series.	Poor: silty clay below depth of 2 inches.	Poor: poor traffic-supporting capacity.	Poor traffic-supporting capacity; slope.	Moderately slow permeability.
*Tippah: TsD2 Mapped only in a complex with Sweatman soils; for Sweatman part of this unit, see Sweatman series.	Fair: silty clay loam below depth of 3 inches.	Poor: poor traffic-supporting capacity.	Poor traffic-supporting capacity; strongly sloping.	Very slow permeability.

and numbers of plants and animals that live in the soil are determined mainly by the climate, but partly by parent material.

Not much is known of the fungi and micro-organisms in the soils of Montgomery County, but they are mainly in the upper few inches. The activity of earthworms and other small invertebrates is greatest in the surface layer, where they continually mix the soil. Mixing of soil materials by rodents does not appear to have much importance in this county.

Except on bottom lands, the native vegetation in the county was chiefly oak, hickory, and pine. In the better drained areas of bottom land, the trees were lowland hardwoods, chiefly yellow-poplar, sweetgum, ash, and oak. In the poorly drained areas, the trees were mainly water-tolerant cypress, birch, blackgum, beech, and oak.

Relief

Relief affects soil formation through its influence on soil drainage, erosion, plant cover, and soil temperature. The relief in Montgomery County ranges from nearly level on flood plains to very steep on uplands. In the hilly uplands the crest of the hills range from 100 to 200 feet above the general level of the flood plains. The greatest relief is in the area of Duck Hill Mountain, where the crest of the mountain is 201 feet above the nearby flood plains.

The slope affects the different soil characteristics. Because the water table is lacking or very deep, the steep and very steep soils have a well-aerated subsoil that is brown or yellowish red and does not have mottles. In level areas and in depressions, the soils are likely to be gray and wet. Because vegetation is thicker in the level areas, the soils commonly have a slightly higher content of organic matter.

Time

Time, usually a long time, is required for formation of distinct horizons in soils. The differences in length of time that parent materials have been in place are commonly reflected in the degree of development of the soil profile.

The soils in Montgomery County range from young to old. The young soils have very little profile development, and the older soils have well-expressed soil horizons.

Collins soils lack development and are an example of young soils. Except for darkening of the surface layer, they retain most of the characteristics of the parent material, which is silt loam. Calloway soils have developed soil horizons and are an example of older soils. They formed in parent material similar to that in which the Collins soils formed, but they developed a bisequel profile that bears little resemblance to the original parent material.

Processes of Soil Horizon Differentiation

Several processes involved in the formation of soil horizons in Montgomery County are the accumulation of organic matter, the leaching of calcium carbonates and bases, the reduction and transfer of iron, and the formation and translocation of silicate clay minerals. In most of the soils, more than one of these processes have been active in the development of horizons.

The accumulation of organic matter in the upper part of the profile is important because it results in the formation of an A1 horizon. The soils of this county are low in content of organic matter.

Carbonates and bases have been leached from nearly all the soils in this county. This leaching has contributed to the development of horizons. Soil scientists generally agree that leaching of bases from the upper horizons of a soil commonly precedes the translocation of silicate clay minerals. Most of the soils in this county are moderately to strongly leached.

The reduction and transfer of iron, a process called gleying, is evident in poorly drained soils of the county. This gleying is indicated by the grayish color

of the soils—Continued

Soil features affecting—Continued				
Farm ponds, embankment	Drainage of cropland and pasture	Irrigation	Terraces and diversions	Waterways
Low compressibility; good stability.	Sloping to steep; well drained.	Moderate permeability; sloping to steep.	Sloping to steep	Medium available water capacity; grows fair sod.
Fair stability; high compressibility.	Slope; well drained	Moderately slow permeability; slope.	Slope	High available water capacity; grows fair sod.
Fair stability; high compressibility.	Strongly sloping; moderately well drained.	Very slow permeability; strongly sloping.	Strongly sloping; soil properties favorable.	High available water capacity; grows good sod.

in the horizons below the surface layer. Segregation of iron is indicated in some horizons by reddish-brown mottles and concretions.

In some soils of Montgomery County, the translocation of clay minerals has contributed to horizon development. The eluviated A2 horizon, above the B horizon, is lower in content of clay than the B horizon and generally is lighter in color. The B horizon commonly has accumulations of clay (clay films) in pores and on ped surfaces. Soils of this kind were probably leached of carbonates and soluble salts to a considerable extent before translocation of silicate clays took place.

The leaching of bases and subsequent translocation of silicate clay are among the more important processes of horizon differentiation that have taken place in the soils of Montgomery County. In the Loring soils and other soils, translocated silicate clays have accumulated in the B horizon in the form of clay films.

Classification of the Soils

Classification consists of an orderly grouping of soils according to a system designed to make it easier to remember soil characteristics and interrelationships. Classification is useful in organizing and applying the results of experience and research. Soils are placed in narrow classes for discussion in detailed soil surveys and for application of knowledge within farms and fields. The many thousands of narrow classes are then grouped into progressively fewer and broader classes in successively higher categories, so that information can be applied to large geographic areas.

Two systems of classifying soils have been used in the United States in recent years. The older system was adopted in 1938 (*2*) and revised later (*10*). The system currently used by the National Cooperative Soil Survey was developed in the early sixties (*11*) and was adopted in 1965. It is under continual study (*9*).

The current system of classification has six categories. Beginning with the most inclusive, these categories are the order, the suborder, the great group, the subgroup, the family, and the series. The criteria for classification are soil properties that are observable or measurable, but the properties are selected so that soils of similar genesis are grouped together. The placement of some soil series in the current system of classification, particularly in families, may change as more precise information becomes available.

Table 8 shows the classification of each soil series of Montgomery County by family, subgroup, and order, according to the current system. Most of the classes of the current system are briefly defined in the following paragraphs.

Order.—Ten soil orders are recognized in the current system. They are Entisols, Vertisols, Inceptisols, Aridisols, Mollisols, Spodosols, Alfiosols, Ultisols, Oxisols, and Histosols. The properties used to differentiate the soil orders are those that tend to give broad climatic groupings of soils. Two exceptions are the Entisols and Histosols that occur in many different climates. Four of the soil orders are represented in Montgomery County. They are Entisols, Inceptisols, Alfisols, and Ultisols.

Entisols are recent mineral soils that do not have genetic diagnostic horizons or have only the beginnings of such horizons. Inceptisols are mineral soils in which genetic horizons have started to develop. They generally form on young, but not recent, land surfaces. Alfisols are soils containing a clay-enriched B horizon that has high base saturation. Ultisols have a clay-enriched B horizon that has less than 35 percent base saturation, which decreases with increasing depth.

Suborder.—Each order is divided into suborders, primarily on the basis of those soil characteristics that produce classes having the greatest genetic similarity. The suborders narrow the broad climatic range permitted in the orders. The soil properties used to separate suborders are mainly those that reflect the pres-

TABLE 7.—*Degree and kind of limitations*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The soils in such to other series that appear in

Soil series and map symbols	Building sites for dwellings [1]	Sewage disposal	
		Sewage lagoons	Septic tank absorption fields
Ariel: Ar	Severe: subject to flooding	Severe: wetness	Severe: subject to flooding; moderately slow permeability.
Arkabutla: At	Severe: subject to flooding; wetness.	Severe: wetness	Severe: subject to flooding; wetness.
Brewton: Br	Severe: wetness	Moderate: fair reservoir site material.	Severe: slow permeability; wetness.
Bruno: Bu	Severe: subject to flooding	Severe: moderately rapid permeability.	Severe: subject to flooding
Calloway: Ca	Severe: wetness	Slight	Severe: slow permeability
Cascilla: Cc	Severe: subject to flooding	Moderate: moderate permeability.	Severe: subject to flooding
*Chenneby: Ch. Mapped only in an association with Arkabutla soils. For Arkabutla part of this unit, see Arkabutla series.	Severe: subject to flooding	Severe: wetness	Severe: subject to flooding; wetness.
Collins: Cm	Severe: subject to flooding	Severe: wetness	Severe: subject to flooding
Gillsburg: Gb	Severe: subject to flooding	Severe: wetness	Severe: subject to flooding; moderately slow permeability.
Grenada:			
GrA	Moderate: wetness	Slight	Severe: slow permeability
GrB2	Moderate: wetness	Moderate: slope	Severe: slow permeability
*Gullied land: GuF. Properties too variable to be rated. Interpretations not made for Gullied land. For Providence part of this unit see Providence series.			
Guyton: Gy	Severe: subject to flooding; wetness.	Moderate: fair dam material.	Severe: subject to flooding; very slow permeability.
Iuka: Iu	Severe: subject to flooding	Severe: wetness	Severe: subject to flooding
Loring:			
LoB2	Moderate: moderate bearing strength.	Moderate: slope	Severe: moderately slow permeability.
LoC2	Moderate: slope	Moderate: slope	Severe: moderately slow permeability.
Mashulaville: Ma	Severe: subject to flooding; wetness.	Slight	Severe: subject to flooding; slow permeability.
Providence:			
PrB2	Moderate: moderate bearing strength.	Moderate: slope	Severe: moderately slow permeability.
PrC, PrC3	Moderate: slope	Moderate: slope	Severe: moderately slow permeability.
PrD2, PrD3	Moderate: slope	Severe: slope	Severe: moderately slow permeability.
*Smithdale:			
SpE. For Providence part of this unit, see Providence series.	Moderate to severe: slope	Severe: slope; moderate permeability.	Moderate to severe: slope
SrE3. For Providence part of this unit, see Providence series.	Moderate to severe: slope	Severe: slope; moderate permeability.	Moderate to severe: slope

See footnote at end of table.

for town and country planning

mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the instructions for referring the first column of this table]

Recreational facilities			
Campsites	Picnic areas	Playgrounds	Paths and trails
Moderate: subject to flooding	Moderate: subject to flooding	Severe: subject to flooding	Slight.
Severe: wetness; subject to flooding.	Moderate: wetness; subject to flooding.	Severe: wetness; subject to flooding.	Moderate: wetness; subject to flooding.
Moderate: wetness	Moderate: wetness	Moderate: wetness	Moderate: wetness.
Severe: subject to flooding	Severe: subject to flooding	Severe: subject to flooding	Severe: subject to flooding.
Moderate: wetness	Moderate: wetness	Moderate: wetness	Moderate: wetness.
Slight	Slight	Slight	Slight.
Severe: subject to flooding; wetness.	Severe: subject to flooding; wetness.	Severe: subject to flooding; wetness.	Severe: subject to flooding; wetness.
Severe: subject to flooding	Moderate: subject to flooding	Severe: subject to flooding	Slight.
Severe: subject to flooding	Moderate: subject to flooding	Severe: subject to flooding	Moderate: subject to flooding; wetness.
Moderate: wetness	Moderate: wetness	Moderate: wetness	Slight.
Moderate: wetness	Moderate: wetness	Moderate: wetness	Slight.
Severe: wetness; subject to flooding.	Severe: wetness; subject to flooding.	Severe: wetness; subject to flooding.	Severe: wetness; subject to flooding.
Severe: subject to flooding	Moderate: subject to flooding	Severe: subject to flooding	Moderate: subject to flooding.
Slight	Slight	Moderate: slope	Slight.
Slight	Slight	Severe: slope	Slight.
Severe: wetness; subject to flooding.	Severe: wetness; subject to flooding.	Severe: wetness; subject to flooding.	Severe: wetness; subject to flooding.
Slight	Slight	Moderate: slope	Slight.
Slight	Slight	Severe: slope	Slight.
Moderate: slope	Moderate: slope	Severe: slope	Slight.
Moderate to severe: slope	Moderate to severe: slope	Severe: slope	Slight to severe: slope.
Moderate to severe: slope	Moderate to severe: slope	Severe: slope	Slight to moderate: slope.

TABLE 7.—*Degree and kind of limitations*

Soil series and map symbols	Building sites for dwellings [1]	Sewage disposal	
		Sewage lagoons	Septic tank absorption fields
*Smithdale: continued SsE. For Providence part of this unit, see Providence series; for Sweatman part of this unit, see Sweatman series.	Moderate to severe: slope.	Severe: slope; moderate permeability.	Severe: slope.
*Sweatman: StF3. For Smithdale part of this unit, see Smithdale series.	Severe: slope.	Severe: slope.	Severe: slope; moderately slow permeability.
*Tippah: TsD2. Mapped only in a complex with Sweatman soils; for Sweatman part of this unit, see Sweatman series.	Moderate to severe: moderate to high shrink-swell potential.	Severe: slope.	Severe: very slow permeability.

[1] Engineers and others should not apply specific values given for bearing strength of soils.

TABLE 8.—*Soil series classified by higher categories*

Series	Family	Subgroup	Order
Ariel	Coarse-silty, mixed, thermic	Fluventic Dystrochrepts	Inceptisols.
Arkabutla	Fine-silty, mixed, acid, thermic	Aeric Fluvaquents	Entisols.
Brewton	Coarse-loamy, siliceous, thermic	Fragiaquic Paleudults	Ultisols.
Bruno	Sandy, mixed, thermic	Typic Udifluvents	Entisols.
Calloway	Fine-silty, mixed, thermic	Glossaquic Fragiudalfs	Alfisols.
Cascilla	Fine-silty, mixed, thermic	Fluventic Dystrochrepts	Inceptisols.
Chenneby	Fine-silty, mixed, thermic	Fluvaquentic Dystrochrepts	Inceptisols.
Collins	Coarse-silty, mixed, acid, thermic	Aquic Udifluvents	Entisols.
Gillsburg	Coarse-silty, mixed, acid, thermic	Aeric Fluvaquents	Entisols.
Grenada	Fine-silty, mixed, thermic	Glossic Fragiudalfs	Alfisols.
Guyton	Fine-silty, siliceous, thermic	Typic Glossaqualfs	Alfisols.
Iuka	Coarse-loamy, siliceous, acid, thermic	Aquic Udifluvents	Entisols.
Loring	Fine-silty, mixed, thermic	Typic Fragiudalfs	Alfisols.
Mashulaville	Coarse-loamy, siliceous, thermic	Typic Fragiaquults	Ultisols.
Providence	Fine-silty, mixed, thermic	Typic Fragiudalfs	Alfisols.
Smithdale	Fine-loamy, siliceous, thermic	Typic Paleudults	Ultisols.
Sweatman	Clayey, mixed, thermic	Typic Hapludults	Ultisols.
Tippah	Fine-silty, mixed, thermic	Aquic Paleudalfs	Alfisols.

ence or absence of waterlogging or soil differences resulting from the climate or vegetation.

Great group.—Suborders are separated into great groups according to the presence or absence of genetic horizons and the arrangement of these horizons. The horizons used to make separations are those in which clay, iron, or humus has accumulated or those that have pans that interfere with the growth of roots or the movement of water. The features used are the self-mulching properties of clays, soil temperature, major differences in chemical composition (mainly calcium, magnesium, sodium, and potassium), and the like. The great group is not shown separately in table 8, because it is the last word in the name of the subgroup.

Subgroup.—Great groups are subdivided into subgroups, one representing the central, or typic, segment of the group, and others, called intergrades, that have properties of one great group and also one or more properties of another great group, suborder, or order. Subgroups are also made in those instances where soil properties intergrade outside of the range of any other great group, suborder, or order.

Family.—Families are separated within a subgroup primarily on the basis of properties important to the growth of plants or to the behavior of soils when used for engineering. Among the properties considered are texture, mineralogy, reaction, soil temperature, permeability, thickness of horizons, and consistence. A family name consists of a series of adjectives preceding the subgroup name.

General Nature of the County

Little is known about the earliest farming in the county. Although the Indians grew corn, most of their food was obtained by hunting and fishing. The first

for town and country planning—Continued

Recreational facilities			
Campsites	Picnic areas	Playgrounds	Paths and trails
Moderate to severe: slope	Moderate to severe: slope	Severe: slope	Slight to severe: slope.
Severe: slope	Severe: slope	Severe: slope	Moderate to severe: slope.
Moderate: slope	Moderate: slope	Severe: slope	Slight.

settlers grew corn, peas, beans, potatoes, and other crops for their own use.

In the 1800's cotton was grown extensively. Cotton is still the most important cash crop in the county, but the amount of cotton grown has decreased since the acreage used for this crop was restricted in the 1930's. Soybeans and timber are other important cash crops. In recent years farming has become more diversified. Of increasing importance are the raising of livestock, particularly beef cattle, and the growing of corn, pasture plants, and small grain to feed the livestock.

Montgomery County was established in 1871 from parts of Carroll and Choctaw Counties. Winona, the county seat, is in the western part of the county. Other towns in the county are Duck Hill and Kilmichael. The population of Montgomery County in 1900 was 16,536. In 1970 it was 12,918, of which 42.7 percent was urban and 57.3 percent was rural.

Although more than half of the income in the county is derived from farm products, the output from industry is increasing. Among the industries in the county are plants that manufacture wood products, shirts, brake linings for automobiles, and concrete and steel pipes. There is also a meat packing plant.

A system of Interstate and U.S. highways connects parts of the county with distant cities. Railroads serving the county are the Illinois Central and the Columbus and Greenville.

Physiography, Drainage, and Relief

Montgomery County, which is in north-central Mississippi, has a rolling and hilly landscape that is broken by level strips of bottom land along the streams.

The county is drained by the Big Black River, Batupan Bogue Creek, and Big Sand Creek. The southern part of the county, which is the largest drainage area, is drained by the Big Black River, the largest stream in the county. The chief tributaries of the Big Black River from the north are Wolf Creek, Mulberry Creek, Lewis Creek, and Hays Creek and from the south are Grape Creek and Popular Creek. The northern part of the county is drained by Batupan Bogue Creek and its tributaries. The western part of the county is drained by Big Sand Creek.

The relief in the county ranges from nearly level on the flood plains to very steep in the hills. The highest part of the county is a range of hills in the western part of the county and is 500 to 550 feet above sea level.

Climate [8]

Montgomery County is in a subtropical area where, during alternating periods, warm, moist air moves northward from the Gulf of Mexico and then cold drier air moves southward. The transition from one period to the other frequently marks an abrupt weather change. Occasionally, during the warmer season, the pressure distribution alters to bring winds that are westerly or northerly. When this happens over an extended period, hot, drier weather results. There have been periods of more than a month when no measurable rain fell in the county. During the colder part of the year, the usual weather cycle is rain followed by a few days of relatively warm balmy weather and then by another rain. The ground freezes occasionally but not to a great depth, and it generally thaws rapidly.

Table 9 shows temperature and precipitation data for Montgomery County, and table 10 shows probabilities of low temperatures in spring and fall. The data in these tables are applicable to most of the farming area in the county.

Summers are consistently warm. Temperatures of 90° F. have occurred at Winona as early as May 2 in 1959, and as late as October in 1953. The number of days in a year when the temperature is as high as 90° ranges from less than 35 to more than 90 and averages 66. Cold spells are generally of short dura-

[8] By E. J. SALTSMAN, climatologist for Mississippi, National Weather Service, U.S. Department of Commerce, Jackson, Mississippi.

tion. A temperature of 32° or lower occurred as early in fall as October 20 in 1961 (31°) and as late in spring as April 19 in 1953 (32°). The number of days in a year when the temperature is 32° or lower ranges from less than 40 to more than 90 and averages 67. On the average, the temperature does not rise above 32° all day on about 2 days a year.

Rainfall generally occurs as showers. Prolonged rain is not frequent and generally occurs in winter and spring, often as a result of warm moist air from the gulf overriding a mass of cold air at the surface. Excessive rainfall, more than one-quarter inch in 5 minutes, may occur in any season. Rainfall of more than 3 inches in a day may occur in any month and cause flash flooding. Occasionally, rainfall is torrential.

Thunderstorms that occur late in fall, in winter, and early in spring may occur at any hour of the day and are more likely to be attended by higher winds than those that occur in summer. They are occasionally accompanied by hail, but most of the hail reported has been less than an inch in diameter.

TABLE 9.—*Temperature and precipitation data*

[Most data from the National Weather Service station at Winona]

Month	Temperature						Precipitation			
	Average daily maximum	Average daily minimum	Average highest maximum	Average lowest minimum	Mean number of days with— Maximum temperatures equal to or higher than 90° F	Mean number of days with— Minimum temperatures equal to or lower than 32° F	Average total	One year in 10 will have— Less than—	One year in 10 will have— More than—	Average snowfall [1]
	° F	° F	° F	° F			Inches	Inches	Inches	Inches
January	53	30	74	9	0	19	4.6	1.6	8.3	0.9
February	58	34	74	16	0	14	5.4	2.5	8.7	.6
March	64	39	77	22	0	9	5.0	2.5	8.0	.2
April	75	51	87	33	0	1	6.2	3.1	9.8	0
May	82	58	92	42	3	0	3.9	1.1	7.4	0
June	88	64	96	51	13	0	3.3	1.4	5.6	0
July	91	68	98	60	21	0	4.5	1.8	8.3	0
August	90	67	97	57	18	0	3.4	1.3	5.8	0
September	87	61	94	47	10	0	3.1	.8	6.1	0
October	76	49	88	32	1	2	2.6	.5	2.9	0
November	65	39	81	19	0	8	4.2	1.2	7.9	.1
December	57	34	74	13	0	14	5.7	1.9	10.5	.5
Year	74	49	[2] 99	[3] 7	66	67	51.9	42.8	62.2	2.3

[1] Data obtained from records kept at several stations.
[2] Average annual highest temperature.
[3] Average annual lowest temperature.

TABLE 10.—*Probabilities of low temperatures in spring and fall*

[All data from the National Weather Service station at Winona; based on records for the period 1953 to 1970. Adjustments made, if necessary, for years in which a temperature as low as indicated was not recorded]

Probability	Dates for given probability at temperature of— 24° F or lower	28° F or lower	32° F or lower	36° F or lower	40° F or lower
Spring:					
1 year in 10 later than	March 28	April 4	April 17	April 23	May 15
2 years in 10 later than	March 20	March 29	April 12	April 19	May 9
5 years in 10 later than	March 5	March 19	April 4	April 10	April 28
Fall:					
1 year in 10 earlier than	November 11	October 27	October 19	October 8	September 29
2 years in 10 earlier than	November 15	November 1	October 23	October 12	October 4
5 years in 10 earlier than	November 23	November 10	October 31	October 21	October 15

Some years go by when snow either does not fall or falls in amounts too small to measure. Heavier snowfall is infrequent and seldom remains on the ground more than 2 or 3 days.

The wind blows from the south quadrant for more hours than from other directions. Wind speed is generally less than 10 miles an hour. Speeds of 45 miles an hour or more are estimated to have an average recurrence interval of about 2 years in this county, but a sustained speed of nearly 70 miles an hour at an elevation of 30 feet above the ground is estimated to have an average recurrence interval of about 50 years in most of the county.

The length of the freeze-free period, or the period between the last temperature of 32° in spring and the first in fall, is used to determine the length of the growing season. The temperature is measured in a standard Weather Service instrument shelter, and the thermometer is 4½ feet above ground. On clear calm nights, the temperature at the level of the shelter is usually several degrees higher than that near the ground. Under these conditions, frost can form on vegetation at ground level, even though the temperature at shelter level is above 32°. The effect of temperature on the vegetation varies with different kinds of vegetation.

Literature Cited

(1) America Association of State Highway Officials.
1970. STANDARD SPECIFICATIONS FOR HIGHWAY MATERIALS AND METHODS OF SAMPLING AND TESTING. Ed. 10, 2 v., illus.

(2) Baldwin, Mark, Kellogg, Charles E., and Thorp, James.
1938. SOIL CLASSIFICATION. U.S. Dept. Agr. Ybk. pp. 978–1001, illus.

(3) Broadfoot, Walter M.
1964. SOIL SUITABILITY FOR HARDWOODS IN THE MIDSOUTH. U.S. For. Serv. Res. Note SO–10, 10 pp., illus.

(4) Fowells, H. A.
1965. SILVICS OF FOREST TREES OF THE UNITED STATES. U.S. Dept. Agr. Handbook 271, 762 pp., illus.

(5) Hedlund, A., and Earles, J. M.
1969. FOREST STATISTICS FOR MISSISSIPPI COUNTIES. U.S. Dept. Agr., South. For. Expt. Sta., For. Serv. Resource Bull. SO–15, 24 pp.

(6) Lemmon, Paul E.
1958. SOIL INTERPRETATIONS FOR WOODLAND CONSERVATION. Mich. Agr. Expt. Sta., 1st No. Amer. For. Soils Conf., Proc., pp. 153–158.

(7) ———
1968. GROUPING SOILS ON THE BASIS OF WOODLAND SUITABILITY. N.C. State Univ., Tree Growth and Forest Soils, 3d No. Amer. For. Soils Conf. Proc., pp. 413–426.

(8) Mississippi Forestry Comission.
1970. FACTS AT A GLANCE 1969–70. Miss. Forestry Commission Publication 3, 4 pp., illus.

(9) Simonson, Roy W.
1962. SOIL CLASS.FICATION IN THE UNITED STATES. Sci. 137: 1027–1034.

(10) Thorp, James, and Smith, Guy D.
1949. HIGHER CATIGORIES OF SOIL CLASSIFICATION: ORDER, SUBORDER, AND GREAT SOIL GROUPS. Soil Sci. 67: 117–126.

(11) United States Department of Agriculture.
1960. SOIL CLASSIFICATION, A COMPREHENSIVE SYSTEM, 7TH APPROXIMATION. 265 pp., illus. [Supplements issued in March 1967, September 1968, and April 1969]

(12) ———
1951. SOIL SURVEY MANUAL. U.S. Dept. Agr. Handbook 18, 503 pp., illus.

(13) United States Department of Defense.
1968. UNIFIED SOIL CLASSIFICATION SYSTEM FOR ROADS, AIRFIELDS, EMBANKMENTS AND FOUNDATIONS. MIL-STD-619B, 30 pp., illus.

Glossary

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates such as crumbs, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Soil material, such as sand, silt, or clay, that has been desposited on land by streams.

Available water capacity (also termed available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

Bedding. Plowing, grading, or otherwise elevating the surface of a flat field into a series of broad beds, or "lands," so as to leave shallow surface drains between the beds.

Buried soil. A developed soil, once exposed but now overlain by more recently formed soil.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of clay on the surface of a soil aggregate. Synonyms: clay coat, clay skin.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrations of compounds, or of soil grains cemented together. The composition of some concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are examples of material commonly found in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Contour farming. Plowing, cultivating, planting, and harvesting in rows that are at right angles to the natural direction of the slope or that are parallel to terrace grade.

Fragipan. A loamy, brittle, subsurface horizon that is very low in organic-matter content and clay but is rich in silt or very fine sand. The layer is seemingly cemented. When dry, it is hard or very hard and has a high bulk density in comparison with the horizon or horizons above it. When moist, the fragipan tends to rupture suddenly if pressure is applied, rather than to deform slowly. The layer is generally mottled, is slowly or very slowly permeable to water, and has few or many bleached fracture planes that form polygons. Fragipans are a few inches to several feet thick; they generally occur below the B horizon, 15 to 40 inches below the surface.

Gleyed soil. A soil in which waterlogging and lack of oxygen have caused the material in one or more horizons to be neutral gray in color. The term "gleyed" is applied to soil horizons with yellow and gray mottling caused by intermittent waterlogging.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon.—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon.—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Leached soil. A soil from which most of the soluble materials have been removed from the entire profile or have been removed from one part of the profile and have accumulated in another part.

Loess. Fine-grained material, dominantly of silt-sized particles, that has been deposited by wind.

Mottling, soil. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: Abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are these: *fine,* less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse,* more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Parent material. Disintegrated and partly weathered rock from which soil has formed.

Percolation. The downward movement of water through the soil.

Permeability. The quality that enables the soil to transmit water or air. Terms used to describe permeability are as follows: *very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Sand. Individual rock or mineral fragments in a soil that range in diameter from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The condition of the soil in relation to the growth of plants, especially soil structure. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Topsoil. A presumed fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both the description of the mapping unit and that of the soil series to which the mapping unit belongs. For general information about management, read both the description of the mapping unit and the section "Use and Management of the Soils" beginning on page 24. The capability classification is discussed on pages 25 and 26. For information on use of soils for woodland, see the section beginning on page 26. Other information is given in tables as follows:

Acreage and extent, table 1, page 6.
Estimated yields, table 2, page 27.
Suitability for wildlife, table 4, page 32.
Engineering uses of soils, tables 5 and 6, pages 36 through 43.
Limitations for town and country planning, table 7, page 44.

Map symbol	Mapping unit	Described on page	Capability unit	Woodland group
			Symbol	Symbol
Ar	Ariel silt loam	6	IIw-2	1o7
At	Arkabutla silt loam	7	IIw-3	1w8
Br	Brewton fine sandy loam	8	IIIw-1	2w8
Bu	Bruno soils	9	IIIs-1	2s5
Ca	Calloway silt loam	10	IIw-4	2w8
Cc	Cascilla silt loam	10	I-1	1o7
Ch	Chenneby-Arkabutla association	12	IVw-1	1w8
Cm	Collins silt loam	12	IIw-2	1o7
Gb	Gillsburg silt loam	13	IIw-3	2w9
GrA	Grenada silt loam, 0 to 2 percent slopes	15	IIw-1	3o7
GrB2	Grenada silt loam, 2 to 5 percent slopes, eroded	16	IIe-1	3o7
GuF	Gullied land-Providence complex, 5 to 25 percent slopes	16	VIIe-1	(1/)
Gy	Guyton silt loam	17	IIIw-2	2w9
Iu	Iuka fine sandy loam	17	IIw-2	1w8
LoB2	Loring silt loam, 2 to 5 percent slopes, eroded	18	IIe-1	3o7
LoC2	Loring silt loam, 5 to 8 percent slopes, eroded	18	IIIe-1	3o7
Ma	Mashulaville fine sandy loam	19	IVw-2	3w9
PrB2	Providence silt loam, 2 to 5 percent slopes, eroded	20	IIe-1	3o7
PrC	Providence silt loam, 5 to 8 percent slopes	20	IIIe-1	3o7
PrC3	Providence silt loam, 5 to 8 percent slopes, severely eroded	20	IVe-1	3o7
PrD2	Providence silt loam, 8 to 12 percent slopes, eroded	20	IVe-2	3o7
PrD3	Providence silt loam, 8 to 12 percent slopes, severely eroded	21	VIe-1	3o7
SpE	Smithdale-Providence association, hilly	21	VIIe-2	---
	Smithdale part	--	------	3o1
	Providence part	--	------	3o7
SrE3	Smithdale-Providence complex, 8 to 17 percent slopes, severely eroded	22	VIe-1	3o1
SsE	Smithdale-Sweatman-Providence association, hilly	22	VIIe-2	---
	Smithdale part	--	------	3o1
	Sweatman part	--	------	3c2
	Providence part	--	------	3o7
StF3	Sweatman and Smithdale soils, 17 to 30 percent slopes, severely eroded	23	VIIe-2	---
	Sweatman part	--	------	4c2
	Smithdale part	--	------	3o1
TsD2	Tippah-Sweatman complex, 8 to 12 percent slopes, eroded	24	IVe-2	3o7

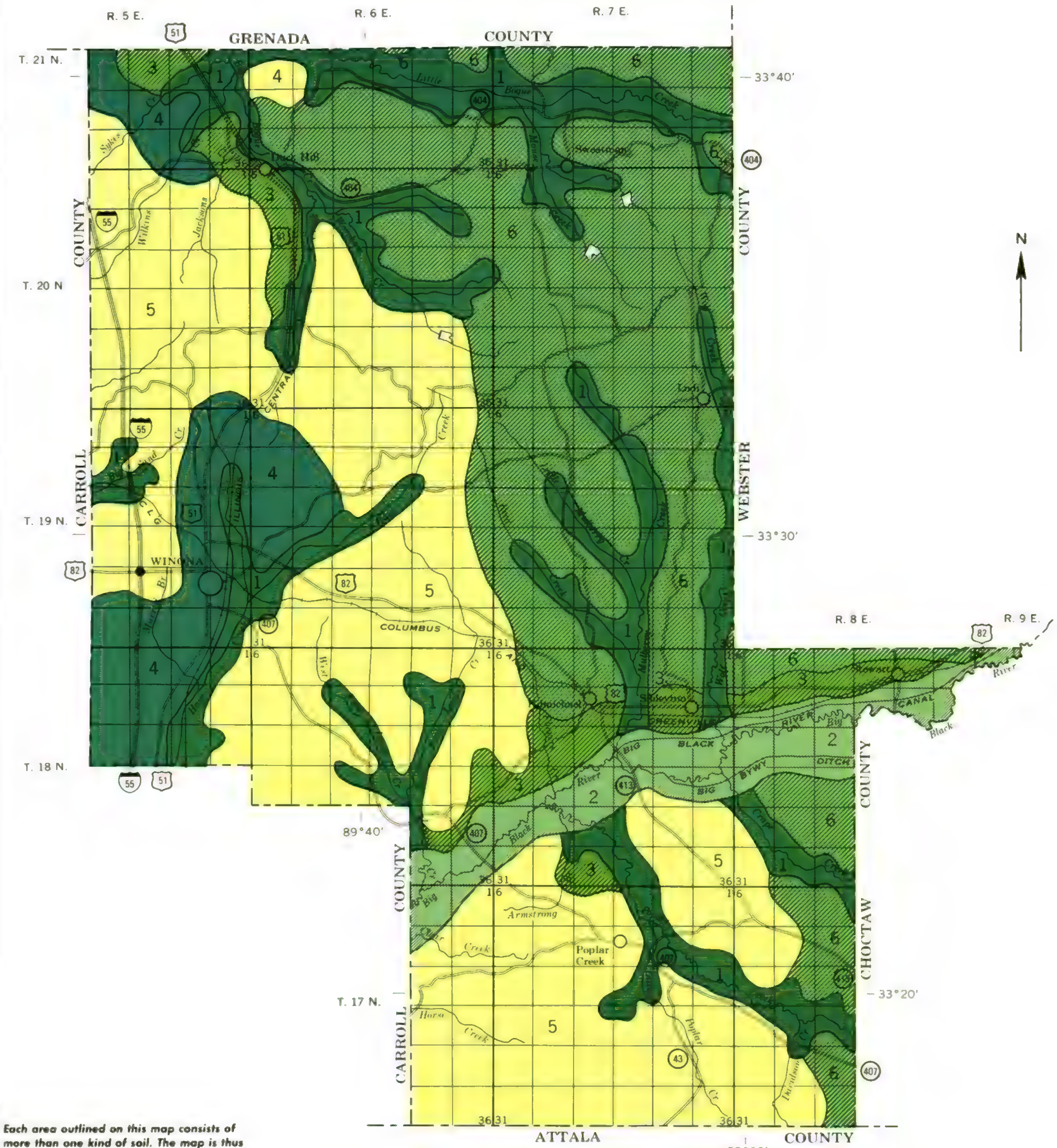
1/ Not placed in a woodland group.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1975— 594-875/18

NRCS Accessibility Statement

This document is not accessible by screen-reader software. The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at 1-800-457-3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at http://offices.sc.egov.usda.gov/locator/app.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.



U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
MISSISSIPPI AGRICULTURAL AND FORESTRY EXPERIMENT STATION

GENERAL SOIL MAP

MONTGOMERY COUNTY, MISSISSIPPI

Scale 1:190,080

1 0 1 2 3 4 Miles

SOIL ASSOCIATIONS*

1. Gillsburg-Collins-Arkabutla association: Nearly level, somewhat poorly drained and moderately well drained, loamy soils; on flood plains
2. Chenneby-Arkabutla-Gillsburg association: Nearly level, somewhat poorly drained, loamy soils; on flood plains
3. Grenada-Calloway association: Nearly level and gently sloping, moderately well drained and somewhat poorly drained, loamy soils that have a fragipan; on uplands
4. Providence-Loring association: Gently sloping and sloping, moderately well drained, loamy soils that have a fragipan; on uplands
5. Smithdale-Providence association: Mainly gently sloping to hilly, well drained and moderately well drained, loamy soils; some have a fragipan; on uplands
6. Smithdale-Sweatman-Providence association: Mainly hilly, well drained and moderately well drained, loamy soils; some are loamy throughout, some have a clayey subsoil, and some have a fragipan; on uplands

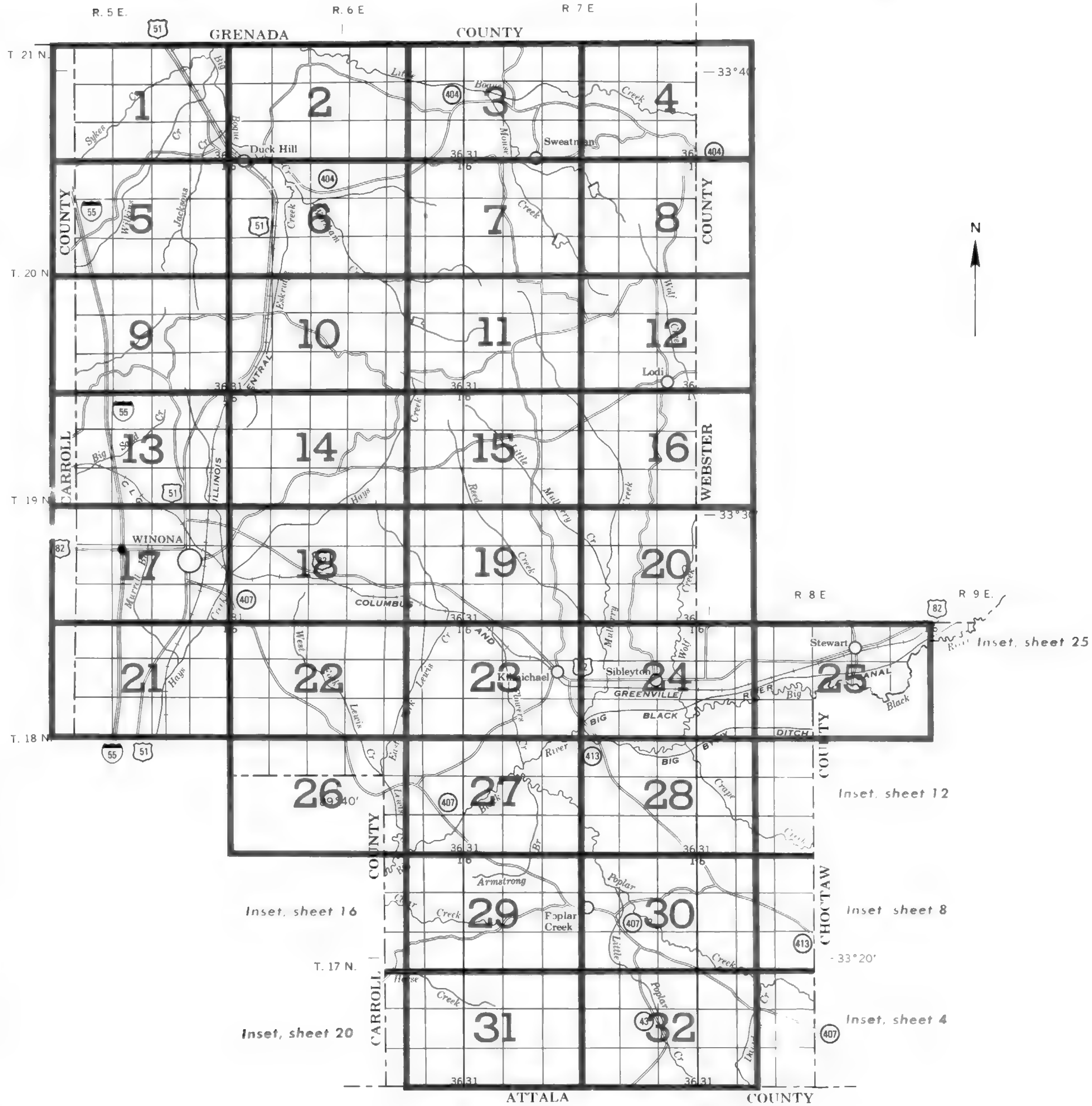
*Unless otherwise stated, the terms for texture used in the descriptive heading of the associations apply to the surface layer of the major soils.

Compiled 1974

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



INDEX TO MAP SHEETS

MONTGOMERY COUNTY, MISSISSIPPI

Scale 1:190,080

1 0 1 2 3 4 Miles

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

SOIL LEGEND

The first capital letter is the initial one of the soil name. A second capital letter, A, B, C, D, E, or F, shows the slope. Symbols without a slope letter are those of nearly level soils. A final number, 2 or 3, in a symbol shows that the soil is eroded or severely eroded.

SYMBOL	NAME
Ar	Ariel silt loam
At	Arkabutla silt loam
Br	Brewton fine sandy loam
Bu	Bruno soils
Ca	Calloway silt loam
Cc	Cascilla silt loam
Ch	Chenneby-Arkabutla association *
Cm	Collins silt loam
Gb	Gillsburg silt loam
GrA	Grenada silt loam, 0 to 2 percent slopes
GrB2	Grenada silt loam, 2 to 5 percent slopes, eroded
GuF	Gullied land-Providence complex, 5 to 25 percent slopes
Gy	Guyton silt loam
Iu	Iuka fine sandy loam
LoB2	Loring silt loam, 2 to 5 percent slopes, eroded
LoC2	Loring silt loam, 5 to 8 percent slopes, eroded
Ma	Mashulaville fine sandy loam
PrB2	Providence silt loam, 2 to 5 percent slopes, eroded
PrC	Providence silt loam, 5 to 8 percent slopes
PrC3	Providence silt loam, 5 to 8 percent slopes, severely eroded
PrD2	Providence silt loam, 8 to 12 percent slopes, eroded
PrD3	Providence silt loam, 8 to 12 percent slopes, severely eroded
SpE	Smithdale-Providence association, hilly *
SrE3	Smithdale-Providence complex, 8 to 17 percent slopes, severely eroded
SsE	Smithdale-Sweatman-Providence association, hilly *
StF3	Sweatman and Smithdale soils, 17 to 30 percent slopes, severely eroded
TsD2	Tippah-Sweatman complex, 8 to 12 percent slopes, eroded

* The delineations generally are much larger and the composition of these units is more variable than other map units in the county. Mapping has been controlled well enough, however, for the anticipated use of the soils.

CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Highways and roads
- Divided
- Good motor
- Poor motor
- Trail

Highway markers
- National Interstate
- U. S.
- State or county

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail
- Railroad
- Ferry (FY)
- Ford (FORD)
- Grade
- R. R. over
- R. R. under

Buildings
- School
- Church

Mine and quarry

Gravel pit

Power line

Pipeline

Cemetery

Dams

Levee

Tanks

Cotton gin

Forest fire or lookout station

Windmill

Located object

BOUNDARIES

- National or state
- County
- Minor civil division
- Reservation
- Land grant
- Small park, cemetery, airport
- Land survey division corners

DRAINAGE

Streams, double-line
- Perennial
- Intermittent

Streams, single-line
- Perennial
- Intermittent
  - Crossable with tillage implements
  - Not crossable with tillage implements
- Unclassified

Canals and ditches

Lakes and ponds
- Perennial (water, w)
- Intermittent (int)

Spring

Marsh or swamp

Wet spot

Drainage end or alluvial fan

RELIEF

Escarpments
- Bedrock
- Other

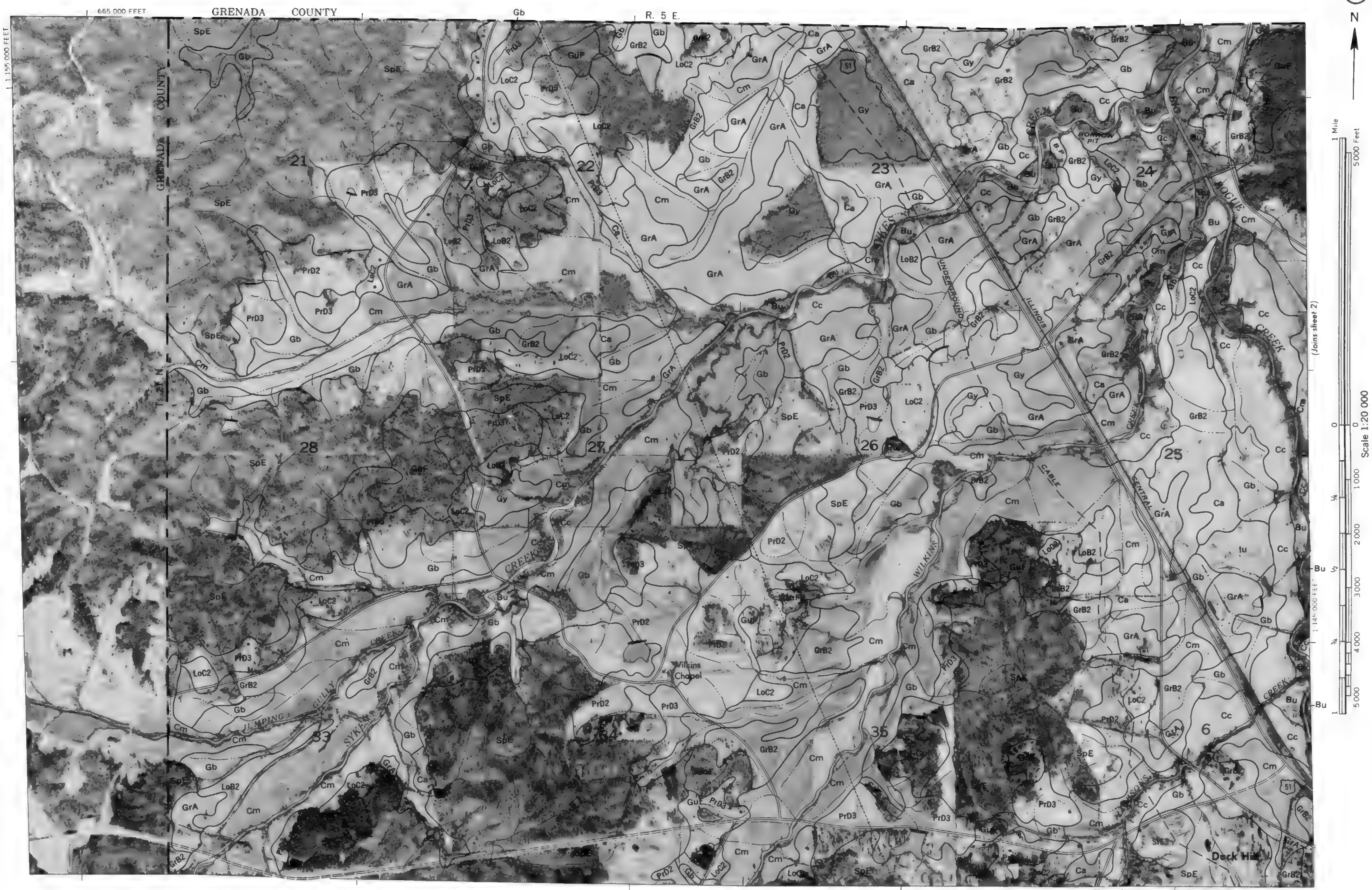
Short steep slope

Prominent peak

Depressions (Large, Small)
- Crossable with tillage implements
- Not crossable with tillage implements
- Contains water most of the time

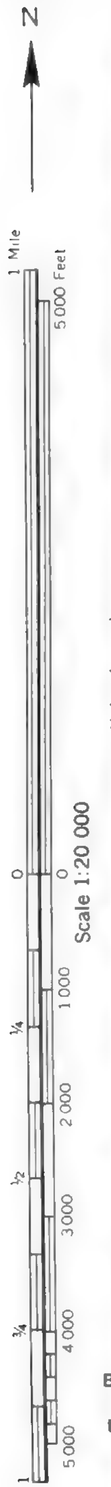
SOIL SURVEY DATA

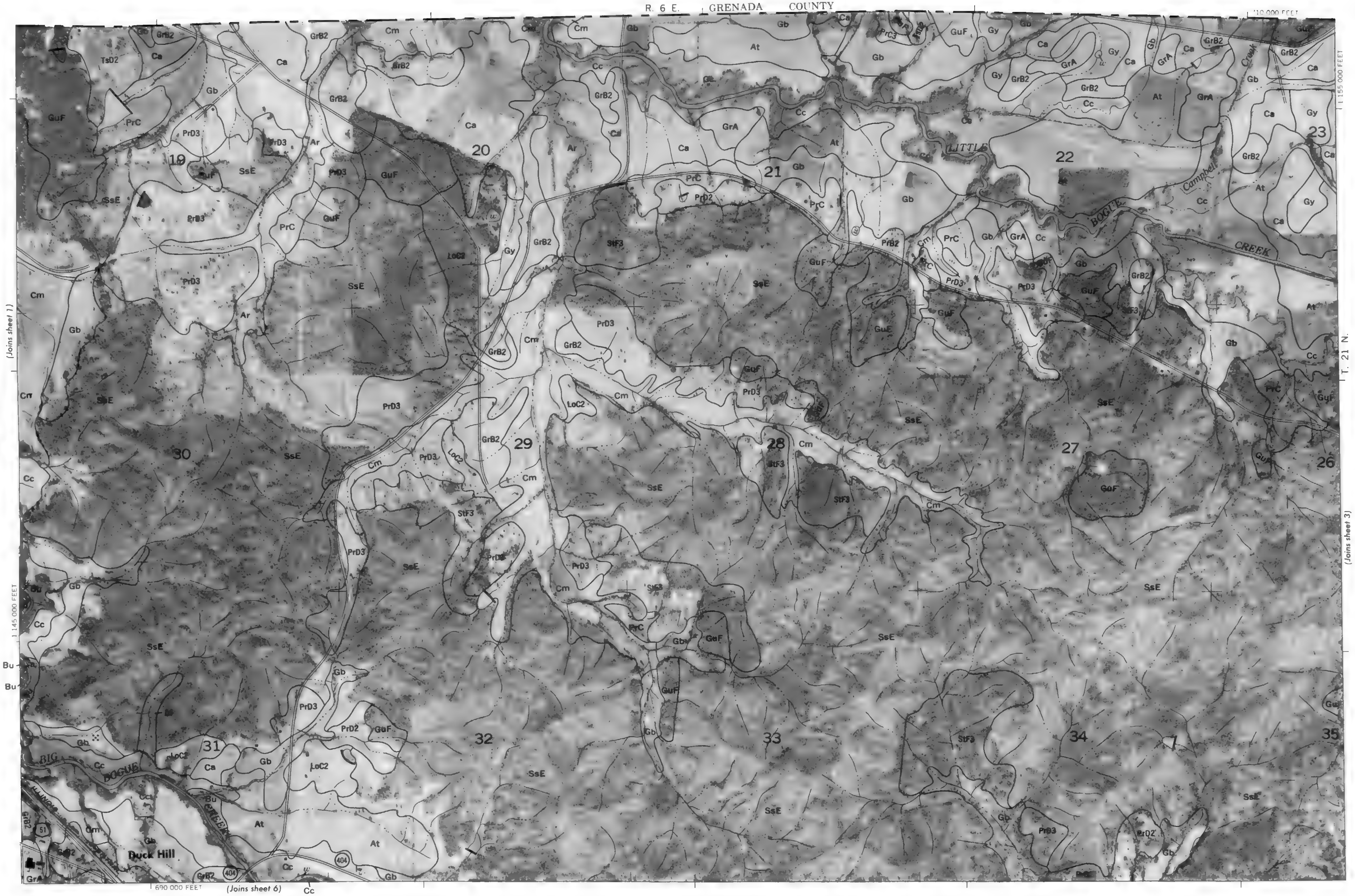
- Soil boundary and symbol (Dx)
- Gravel
- Stoniness: Stony, Very stony
- Rock outcrops
- Chert fragments
- Clay spot
- Sand spot
- Gumbo or scabby spot
- Made land
- Severely eroded spot
- Blowout, wind erosion
- Gully
- Borrow pit (B.P.)
- Sand pit (S.P.)



This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Mississippi coordinate system, west zone.
Land division corners are approximately positioned on this map.

MONTGOMERY COUNTY, MISSISSIPPI — SHEET NUMBER 2

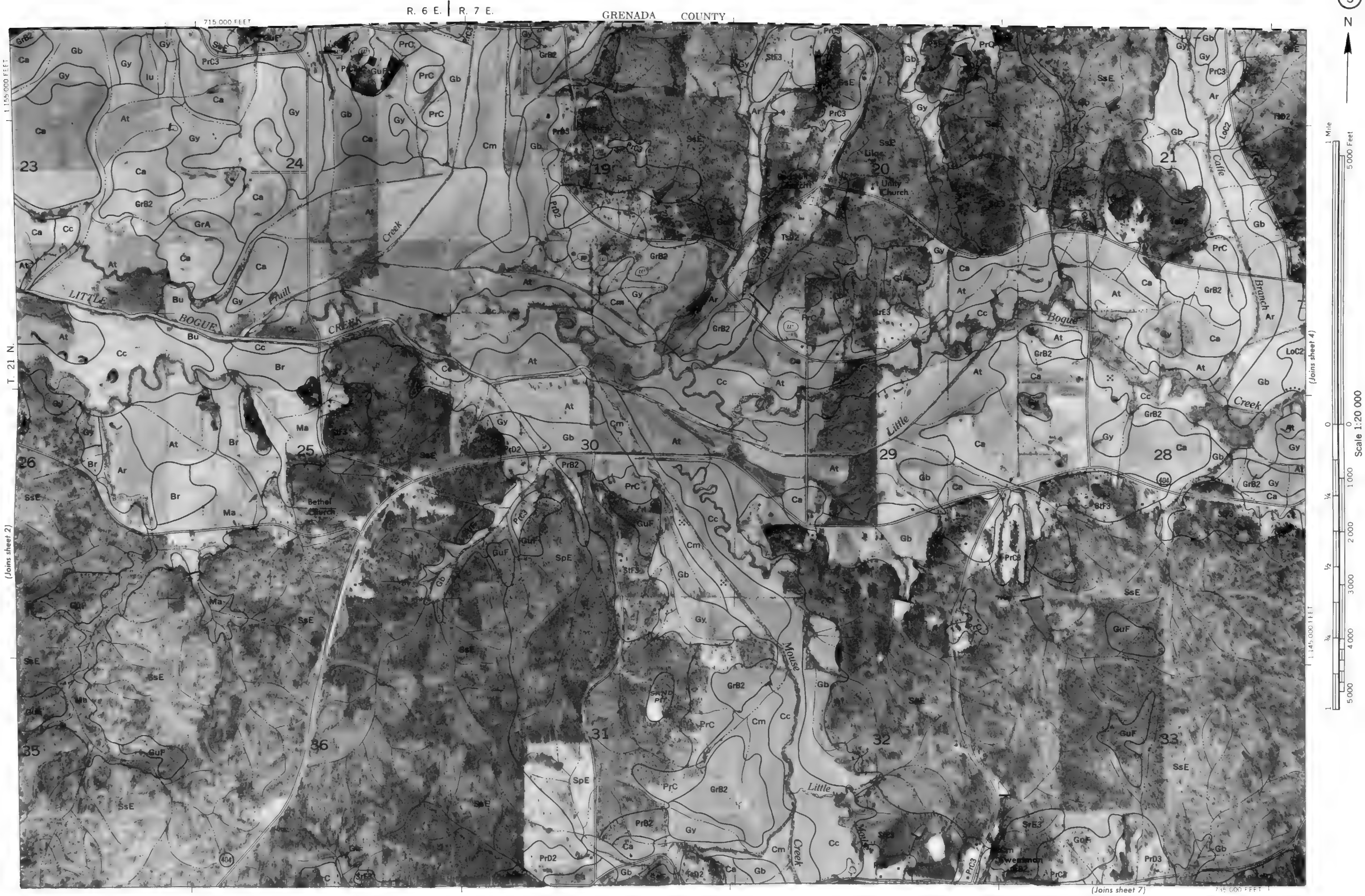




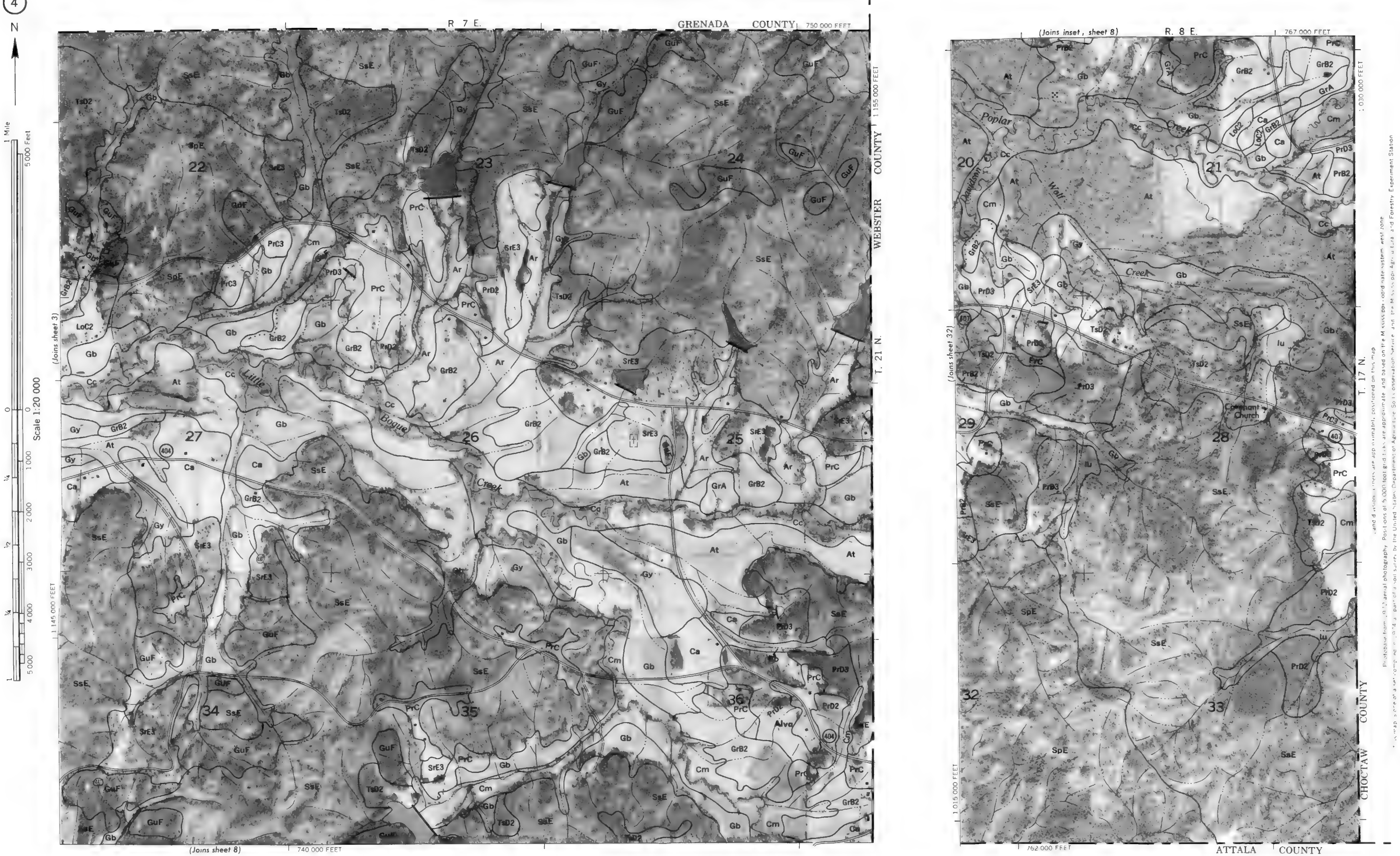
Land division corners are approximately positioned on this map

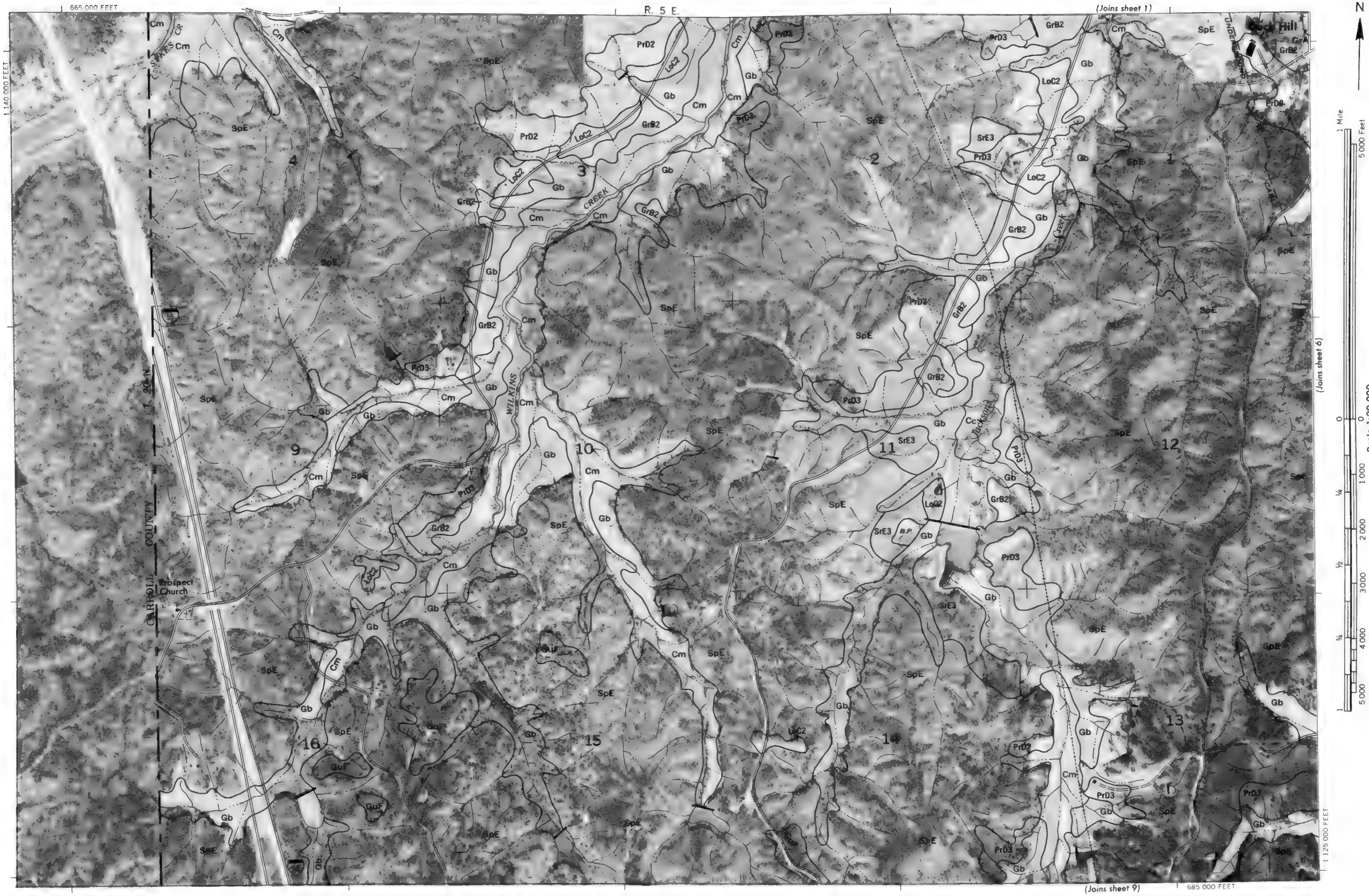
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Mississippi coordinate system, west zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture Soil Conservation Service and the Mississippi Agricultural and Forestry Experiment Station



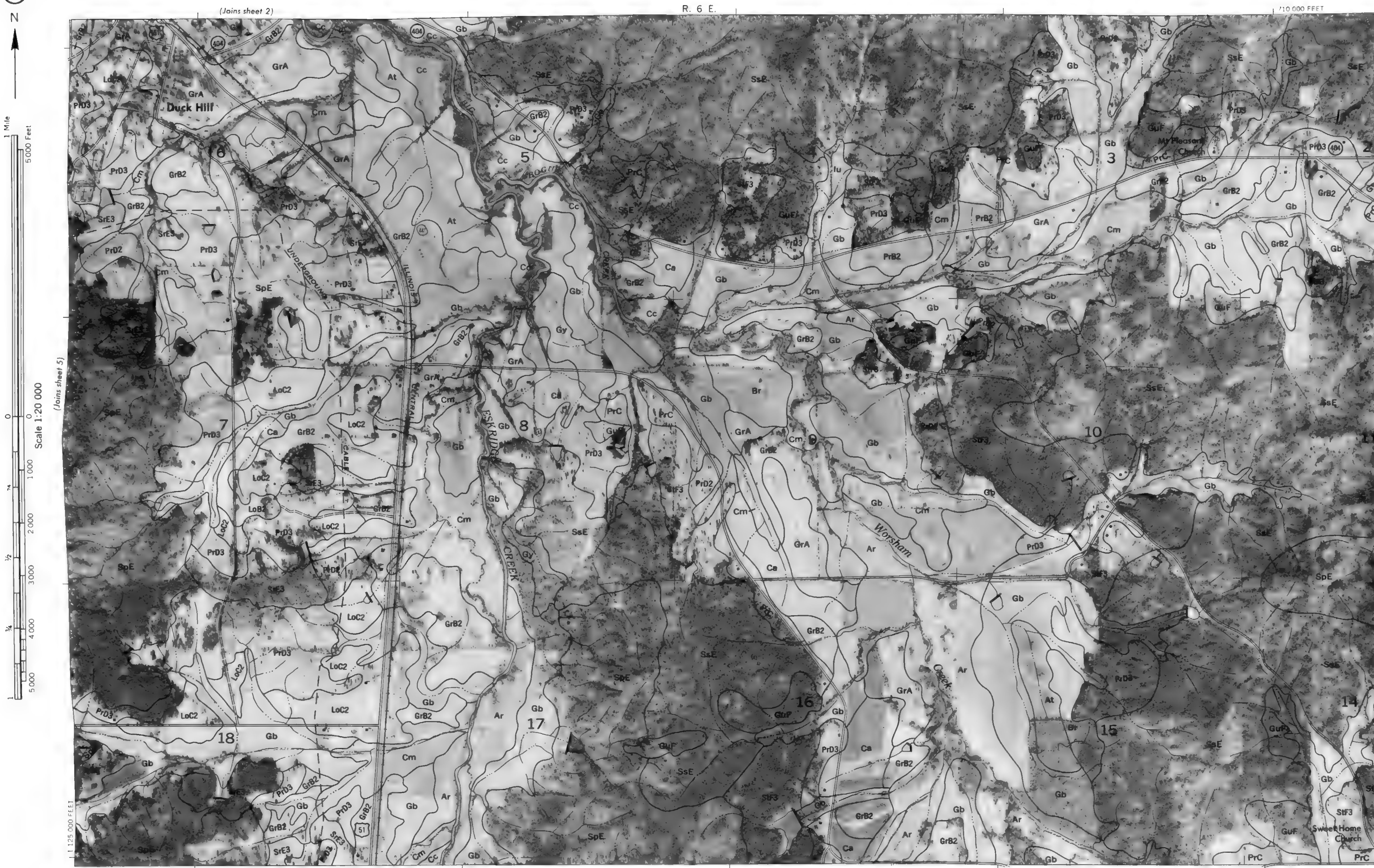
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Mississippi coordinate system, west zone.
Land division corners are approximately positioned on this map.


4
N
R. 7 E.
GRENADA COUNTY
750 000 FEET
1 155 000 FEET
WEBSTER COUNTY
T. 21 N.
(Joins sheet 3)
(Joins sheet 8)
740 000 FEET
1 145 000 FEET
Scale 1:20 000
1 Mile
5 000 Feet
Little
Bogue
Creek
Alva
(Joins inset, sheet 8)
R. 8 E.
767 000 FEET
1 030 000 FEET
Poplar
Creek
Wolf
Creek
Covenant Church
T. 17 N.
(Joins sheet 32)
1 015 000 FEET
762 000 FEET
ATTALA COUNTY
CHOCTAW COUNTY



This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station.
Photobase from 1972 aerial photography. Positions of 5 000 foot grid ticks are approximate and based on the Mississippi coordinate system, west zone.
Land division corners are approximately positioned on this map.

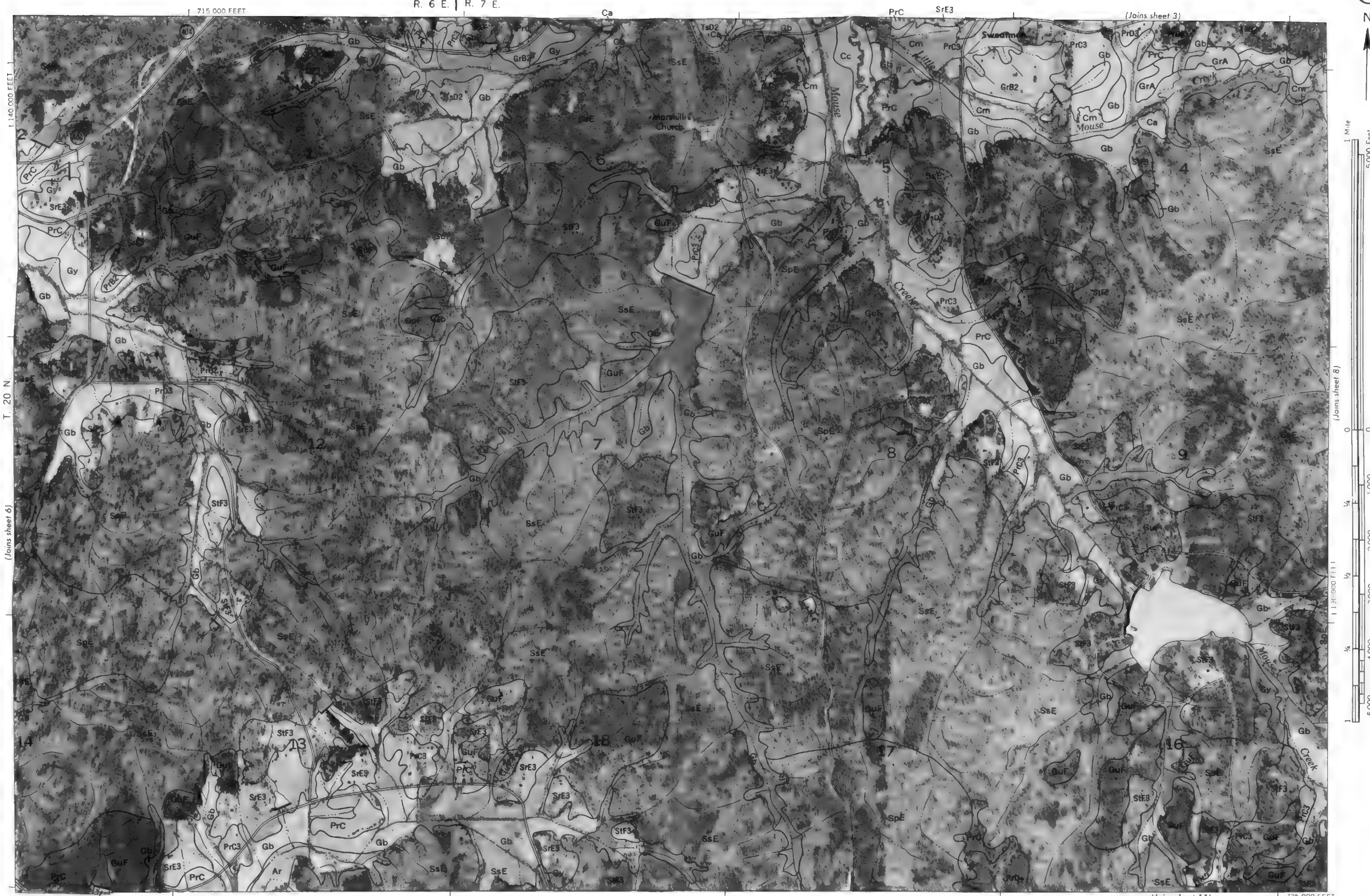
MONTGOMERY COUNTY, MISSISSIPPI — SHEET NUMBER 6



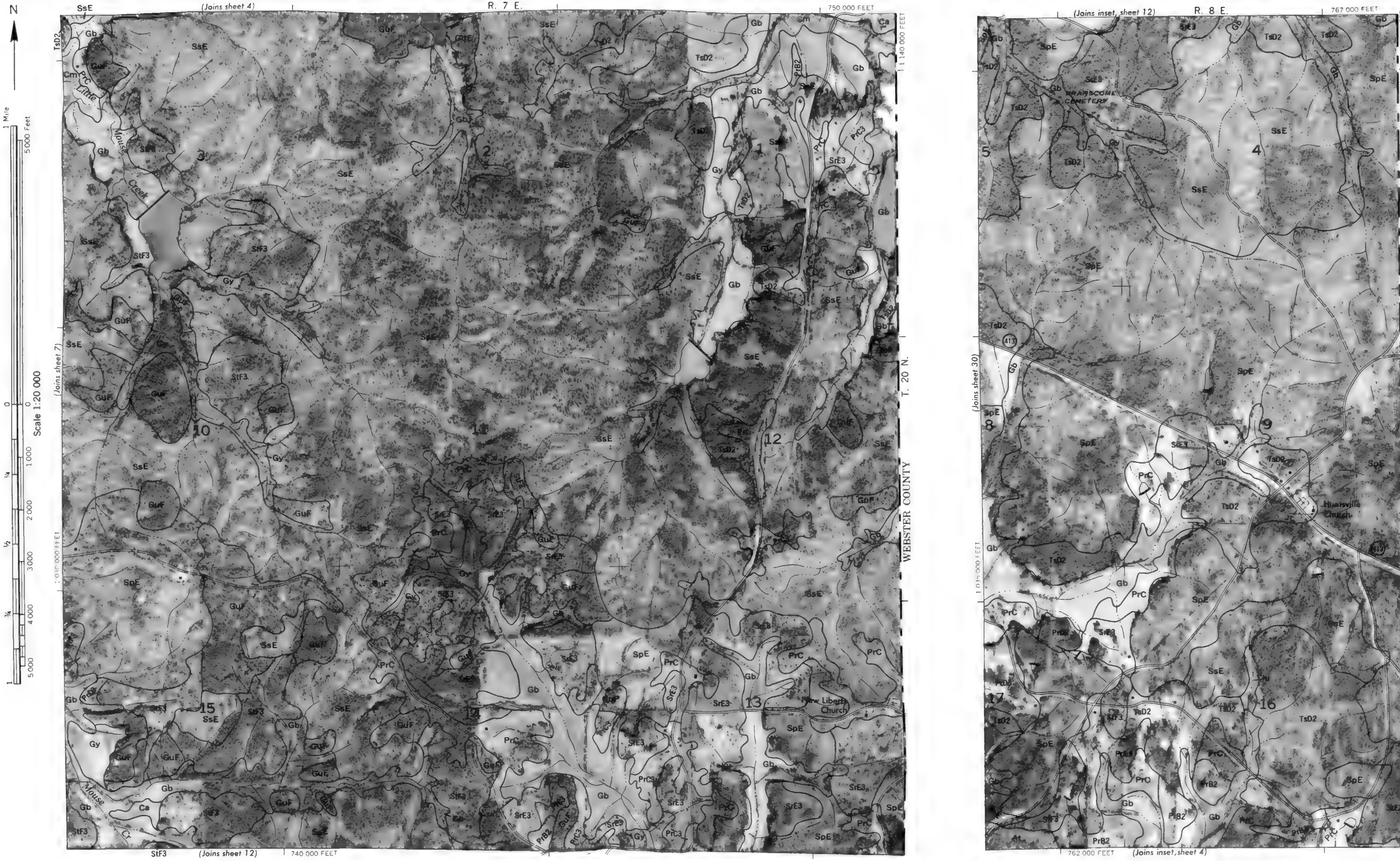
Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Mississippi coordinate system, west zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station



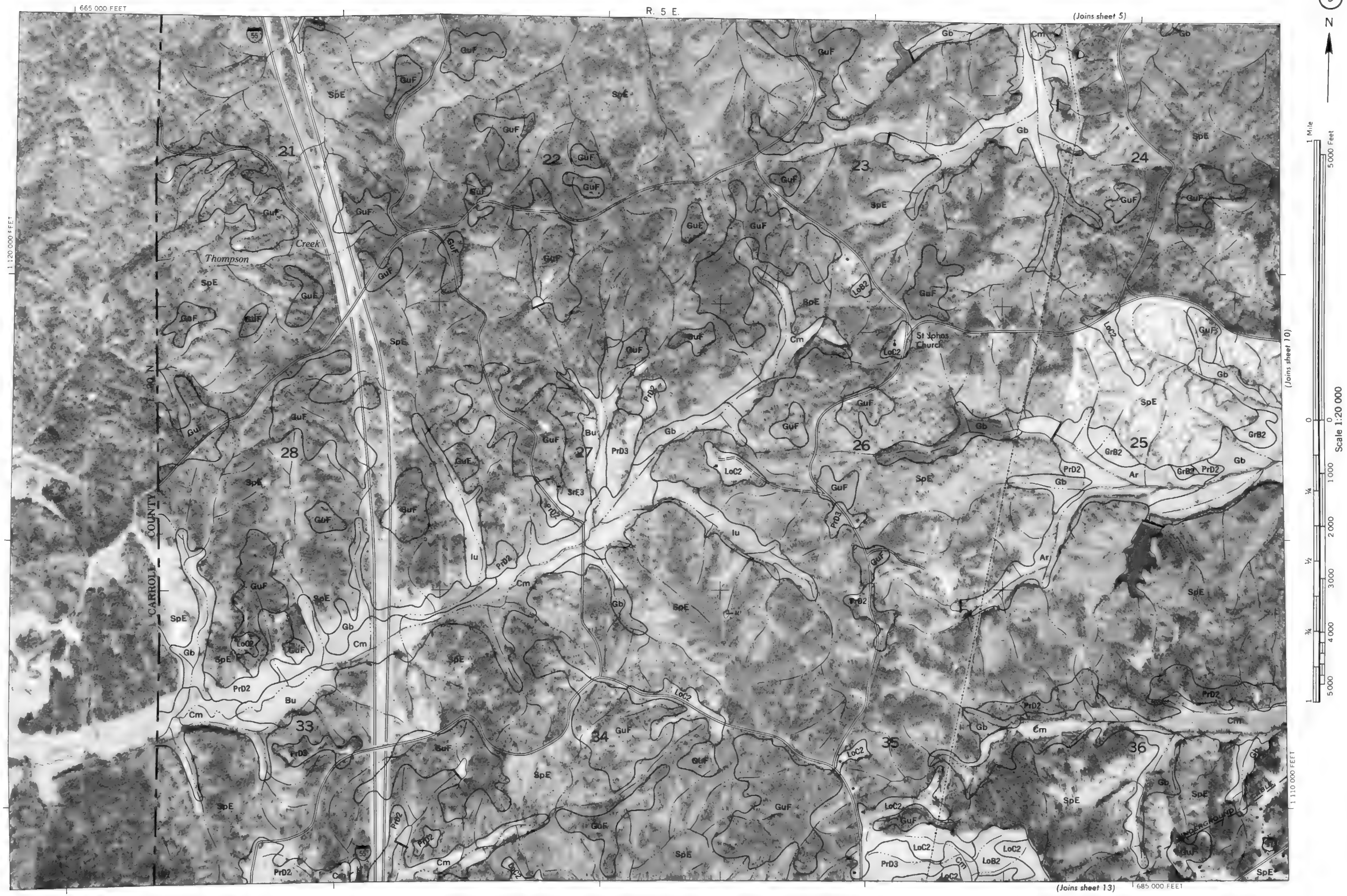
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service and the Mississippi Agricultural and Forestry Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000 foot grid ticks are approximate and based on the Mississippi coordinate system, west zone.
Land division corners are approximately positioned on this map.



Land division corners are approximately positioned on this map

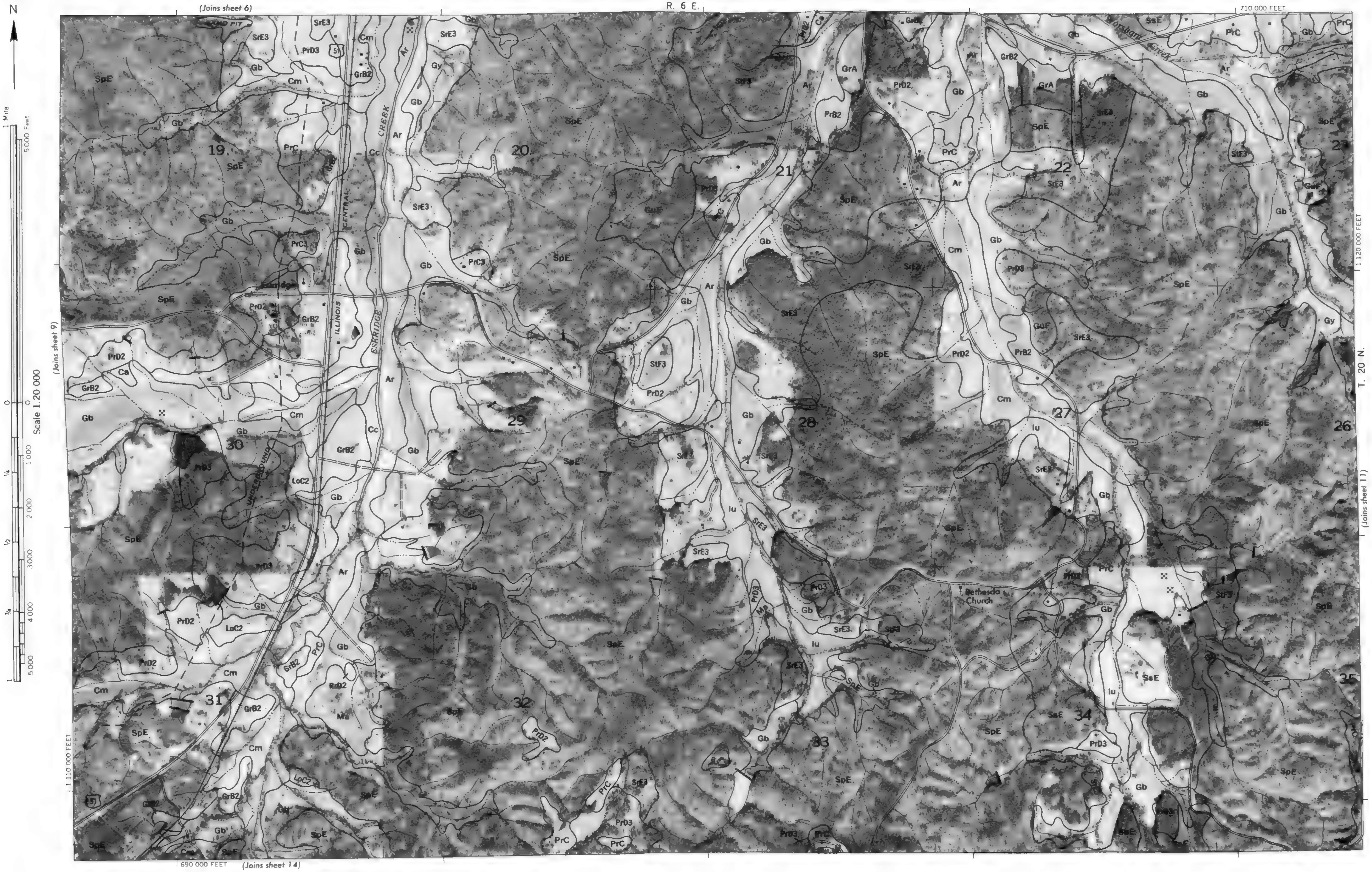
Photobase from 19?2 aerial photography. Positions of 5,000 foot grid ticks are approximate and based on the Mississippi coordinate system, west zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station



This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000 foot grid ticks are approximate and based on the Mississippi coordinate system, west zone.
Land division corners are approximately positioned on this map.

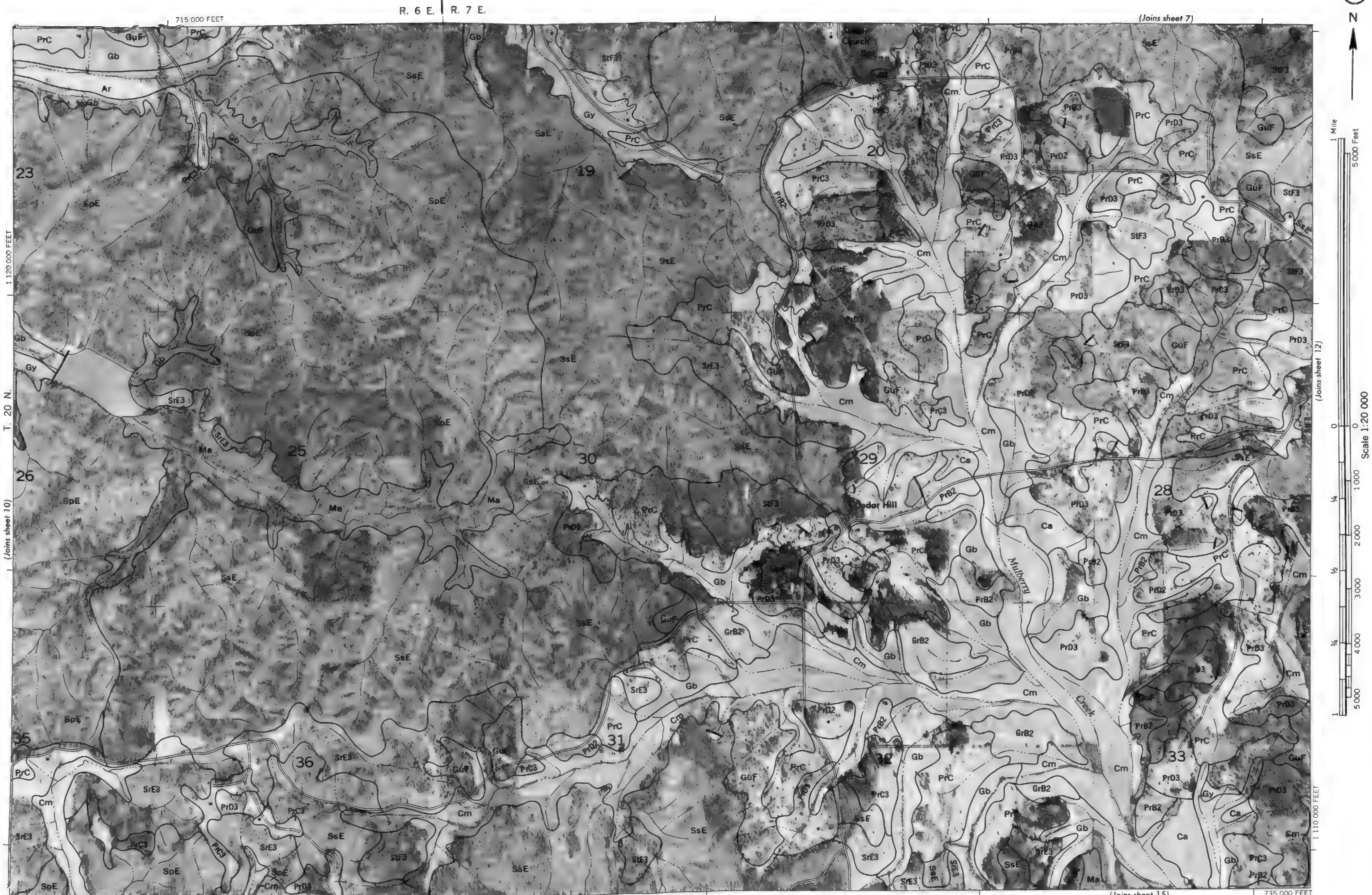
MONTGOMERY COUNTY, MISSISSIPPI — SHEET NUMBER 10



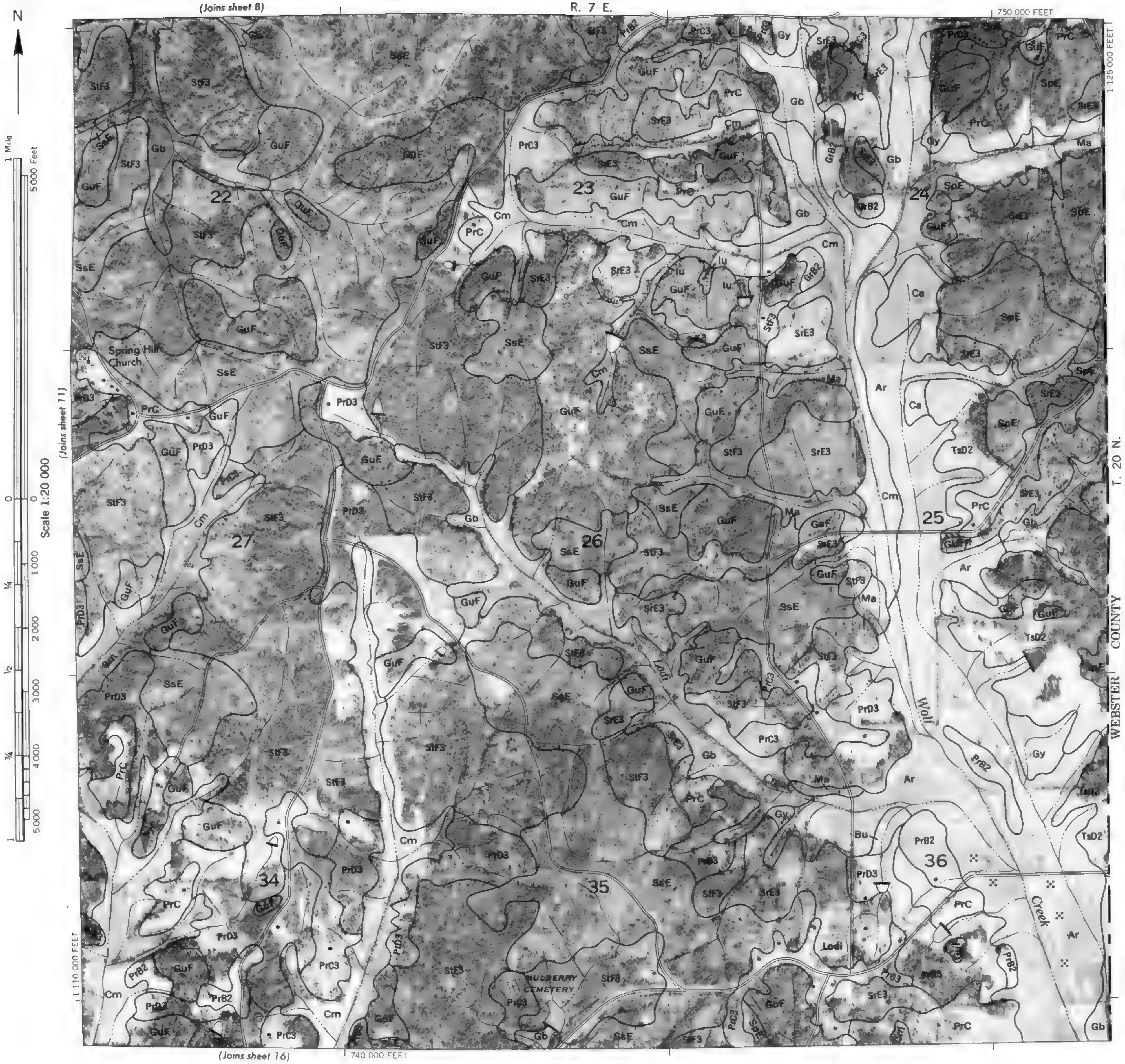
Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Mississippi coordinate system, west zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station



This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Mississippi coordinate system, west zone.
Land division corners are approximately positioned on this map.



MONTGOMERY COUNTY, MISSISSIPPI NO. 12

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Mississippi coordinate system, west zone.
Land division corners are approximately positioned on this map.

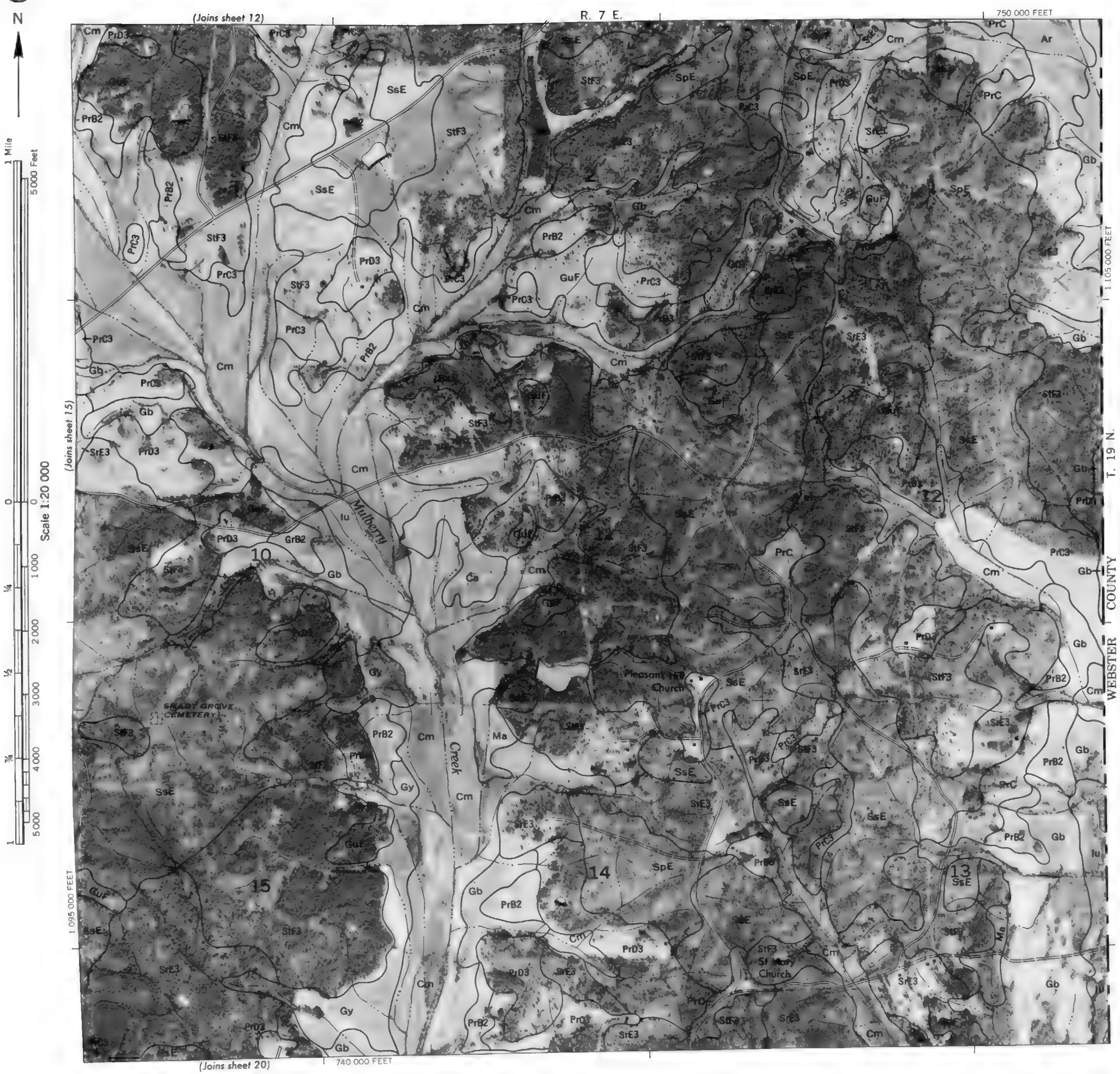
MONTGOMERY COUNTY, MISSISSIPPI — SHEET NUMBER 14

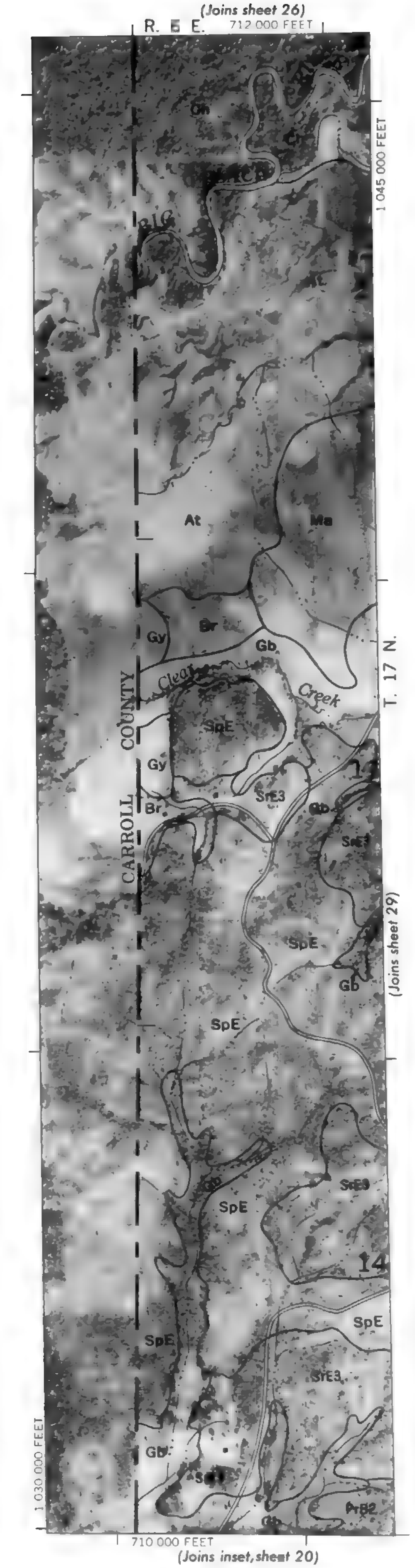
Photobase from 1972 aerial photography. Positions of 5,000 foot grid ticks are approximate and based on the Mississippi coordinate system, west zone. Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station.

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Mississippi coordinate system, west zone.
Land division corners are approximately positioned on this map.

MONTGOMERY COUNTY, MISSISSIPPI — SHEET NUMBER 16





2000 AND 5000 – FOOT GRID TICKS

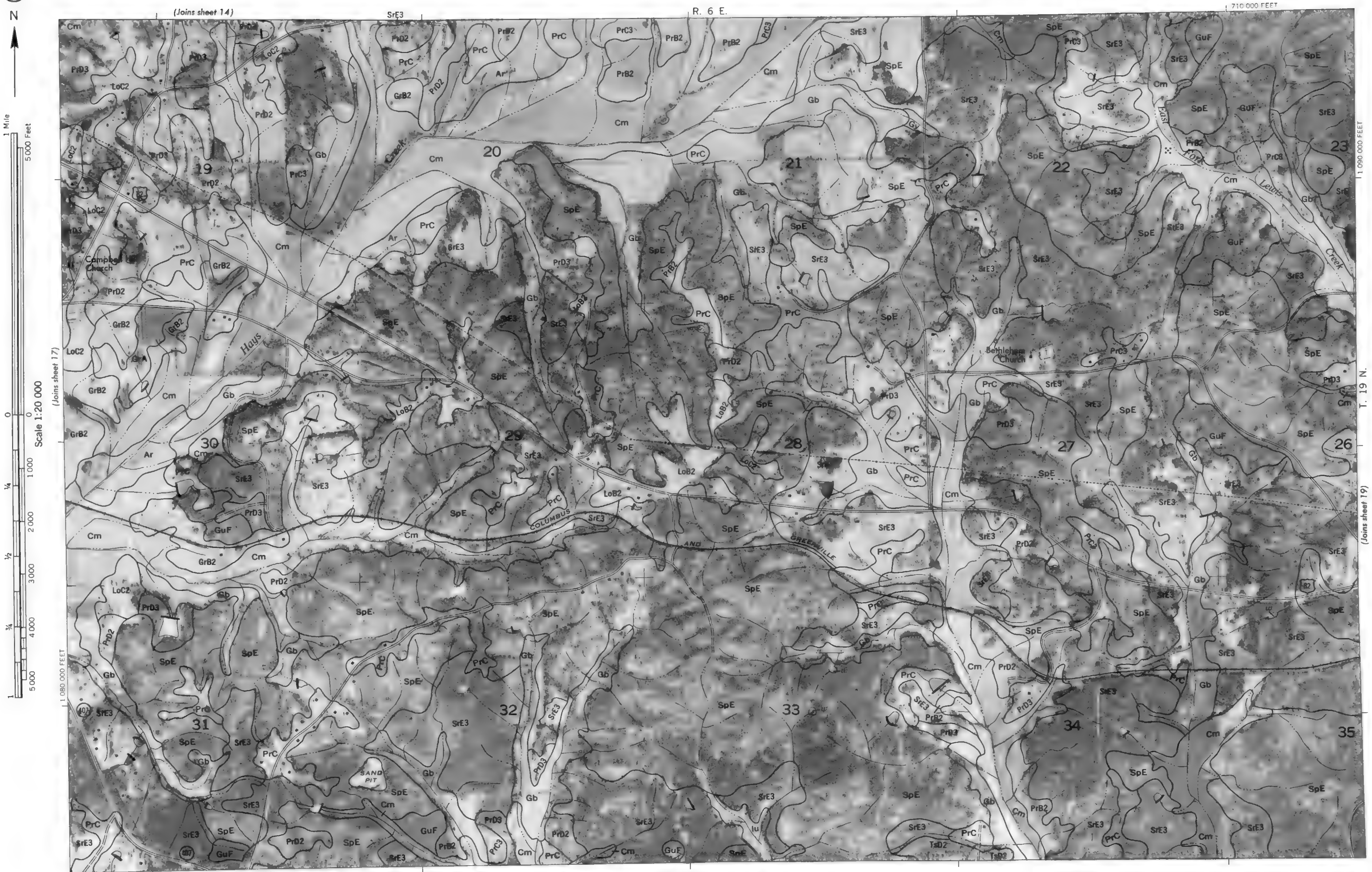
Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Mississippi coordinate system, west zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Mississippi coordinate system, west zone.
Land division corners are approximately positioned on this map.

MONTGOMERY COUNTY, MISSISSIPPI — SHEET NUMBER 18



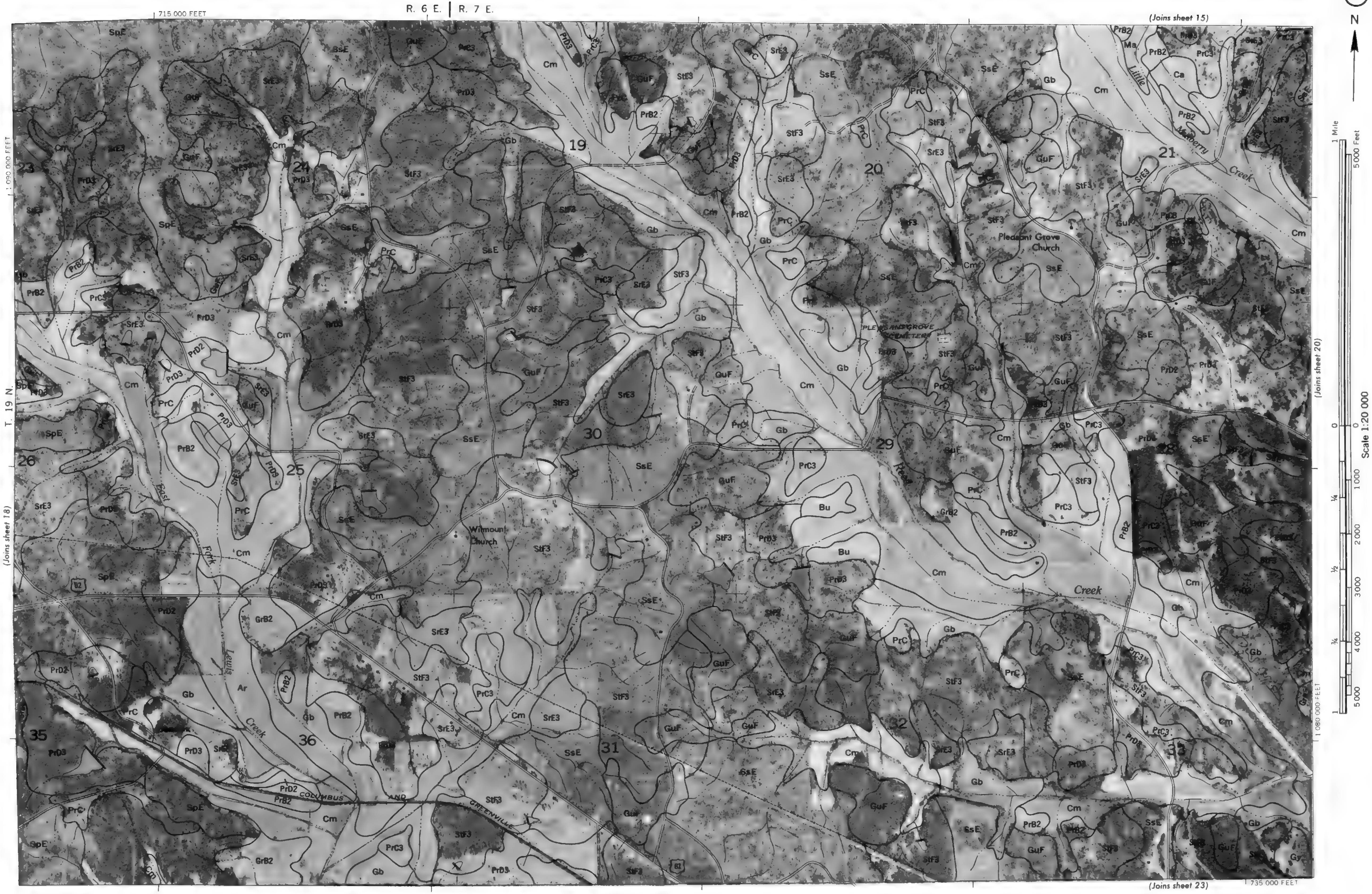
Land division corners are approximately positioned on this map.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Mississippi coordinate system, west zone.

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station.

19

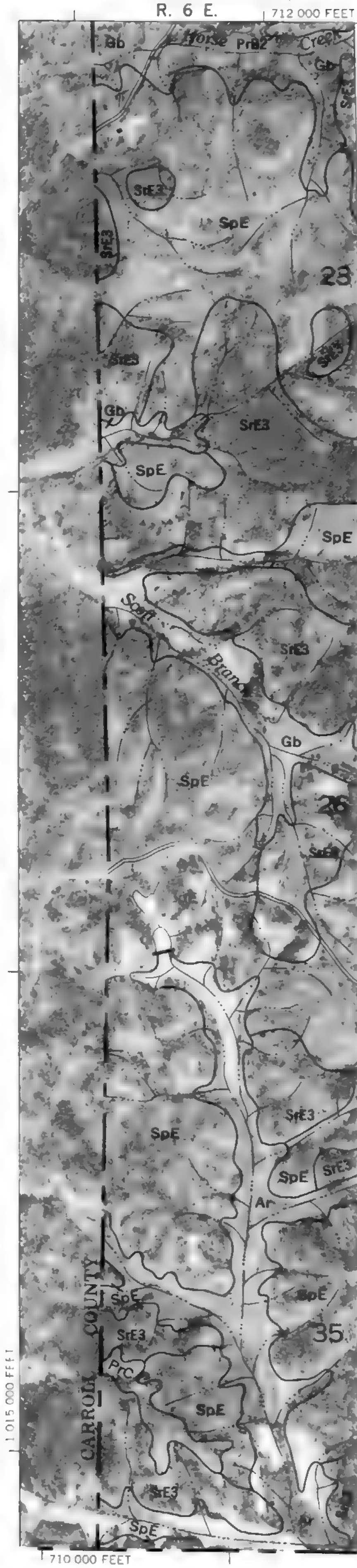
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Mississippi coordinate system, west zone
Land division corners are approximately positioned on this map



(20)

N

Scale 1:20 000



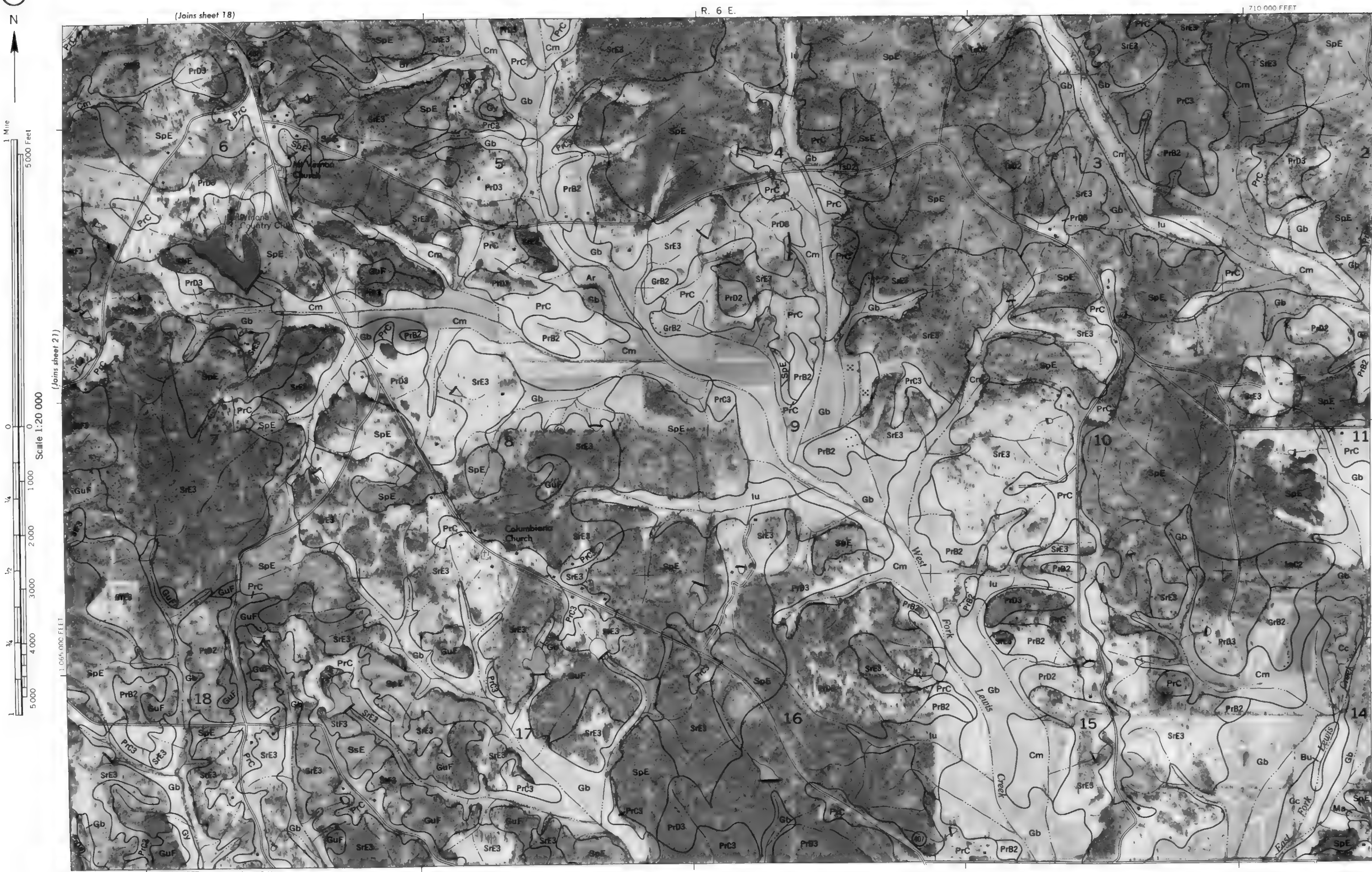
Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Mississippi coordinate system, west zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Mississippi coordinate system, west zone.
Land division corners are approximately positioned on this map.

MONTGOMERY COUNTY, MISSISSIPPI — SHEET NUMBER 22



Land division corners are approximately positioned on this map.

Photobase from 1972 aerial photography. Positions of 5 000-foot grid ticks are approximate and based on the Mississippi coordinate system, west zone.

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station.

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000 foot grid ticks are approximate and based on the Mississippi coordinate system, west zone.
Land division corners are approximately positioned on this map.

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Mississippi coordinate system, west zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station.

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station. Photobase from 1972 aerial photography. Positions of 5,000 foot grid ticks are approximate and based on the Mississippi coordinate system, west zone. Land division corners are approximately positioned on this map.

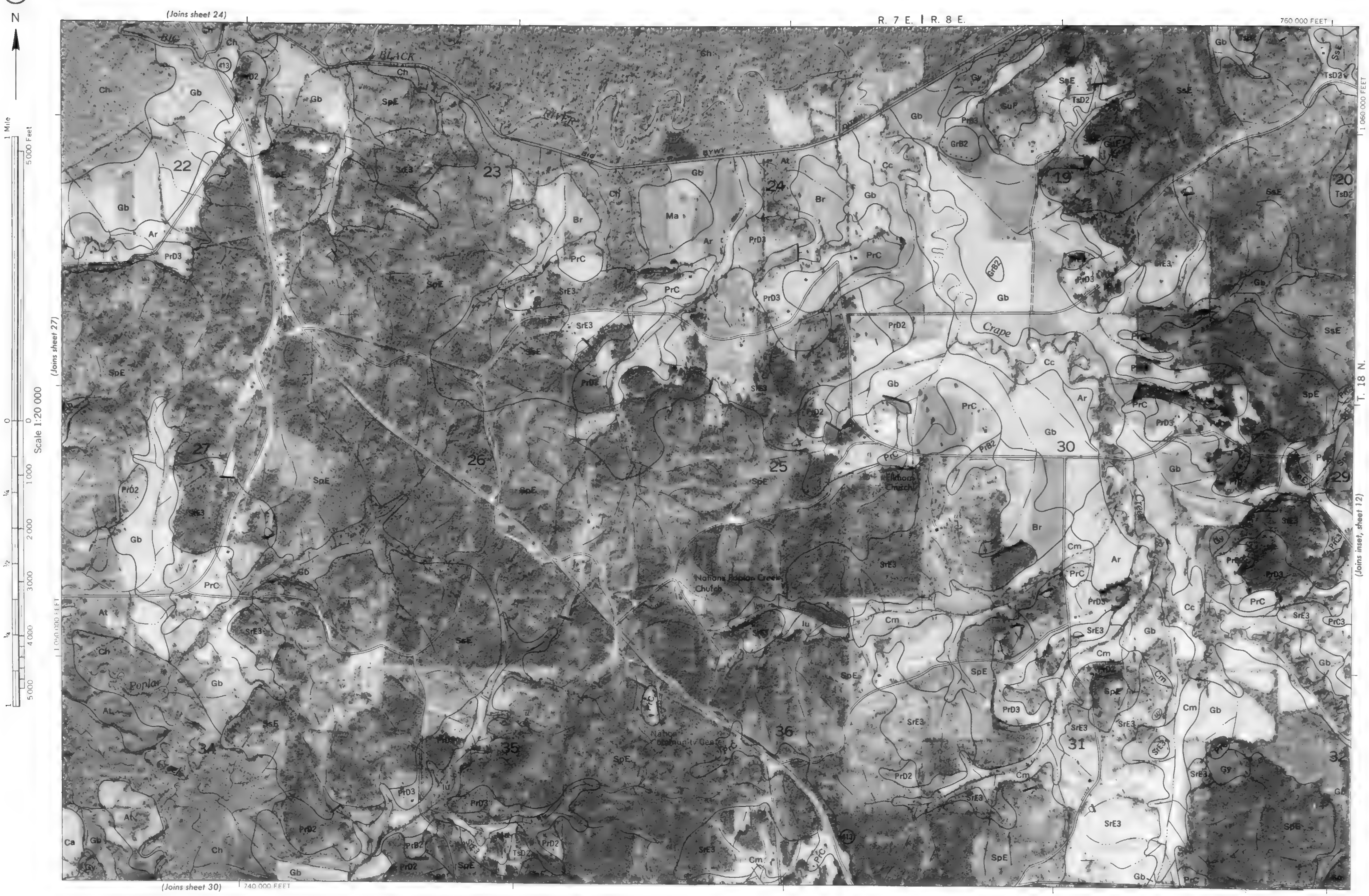
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Mississippi coordinate system, west zone

Land division corners are approximately positioned on this map

This map is one of a set compiled in 1978 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Mississippi coordinate system, west zone.
Land division corners are approximately positioned on this map.

MONTGOMERY COUNTY, MISSISSIPPI — SHEET NUMBER 28



Land division corners are approximately positioned on this map.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Mississippi coordinate system, west zone.

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station.

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Mississippi coordinate system, west zone.
Land division corners are approximately positioned on this map.

MONTGOMERY COUNTY, MISSISSIPPI — SHEET NUMBER 30

N

Scale 1:20 000

1 Mile

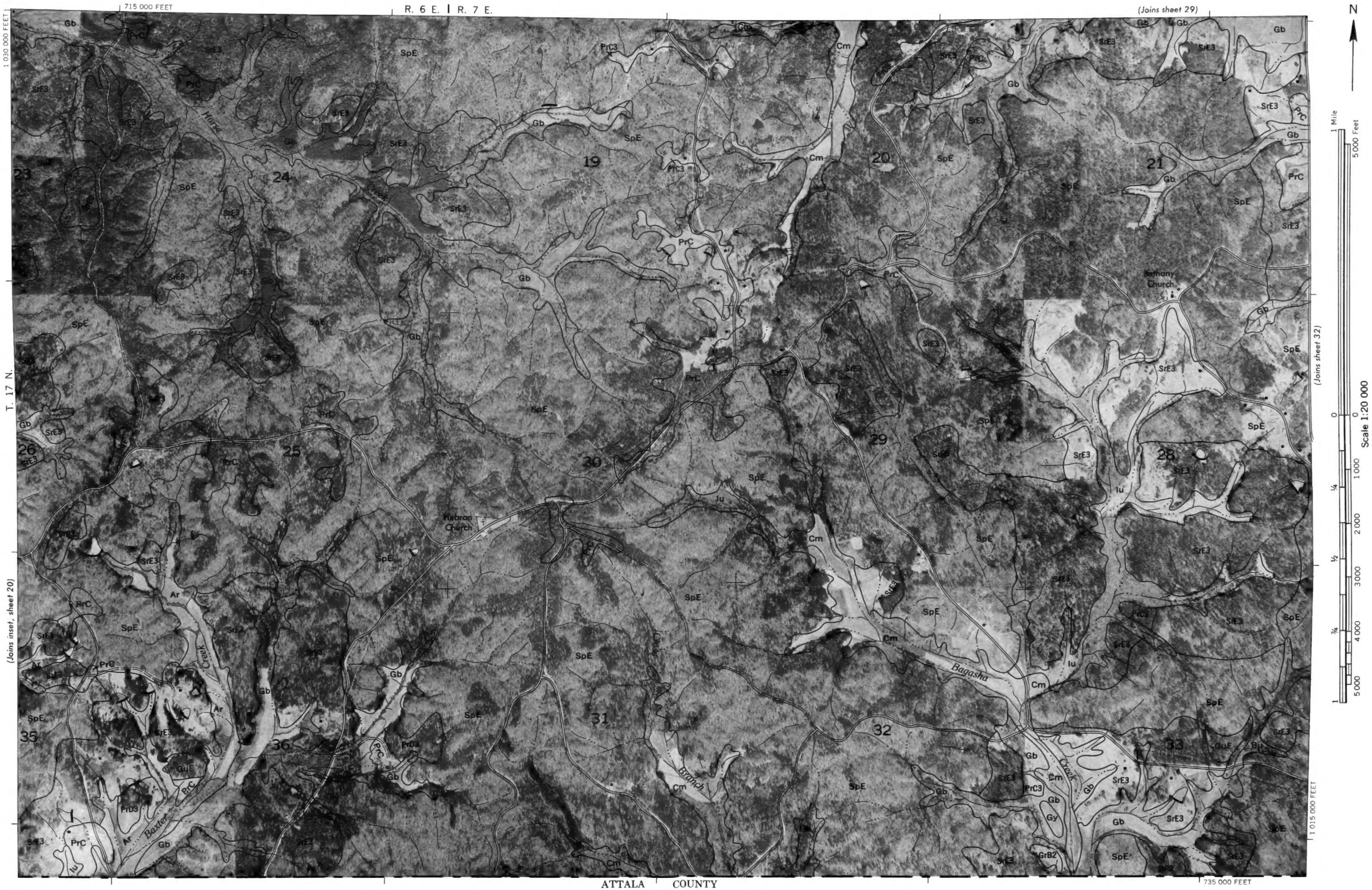
5000 Feet

Land division corners are approximately positioned on this map.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Mississippi coordinate system, west zone.

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station.

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Mississippi coordinate system, west zone
Land division corners are approximately positioned on this map



32

MONTGOMERY COUNTY, MISSISSIPPI — SHEET NUMBER 32

Land division corners are approximately positioned on this map.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Mississippi coordinate system, west zone.

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Mississippi Agricultural and Forestry Experiment Station.